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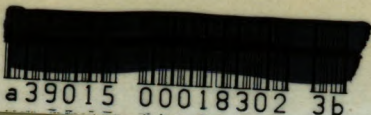
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SIXTH
ANNUAL REPORT
OF THE
STATE FORESTER

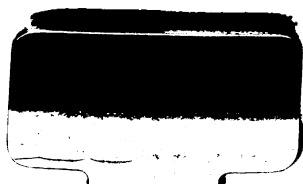
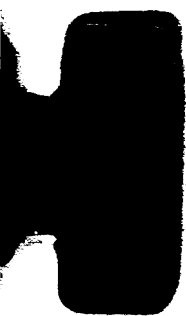
PROGRESS OF FORESTRY
IN VERMONT

AUSTIN F. HAWES
State Forester

1914



ST. ALBANS, VT.
ST. ALBANS MESSENGER COMPANY
1914



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Vermont. Forest service.

SIXTH
ANNUAL REPORT
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PROGRESS OF FORESTRY
IN VERMONT

AUSTIN F. HAWES
State Forester

1914



ST. ALBANS, VT.:
ST. ALBANS MESSENGER COMPANY
1914

TO THE GENERAL ASSEMBLY OF VERMONT.

In compliance with Section 2 of Act No. 11 of the Acts of 1908, I take pleasure in submitting my report on the Progress of Forestry in Vermont.

AUSTIN F. HAWES,
State Forester.

Burlington, Vermont, August 1, 1914.

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A GOOD STAND OF SECOND GROWTH SPRUCE, ROCHESTER, VERMONT.



**THE MAINTENANCE OF THE LUMBER BUSINESS OF VERMONT REQUIRES
FOREST CONSERVATION.**

INTRODUCTION.

Perhaps the largest non-political gathering of Vermonters of recent years was on the occasion of the last annual meeting of the Greater Vermont Association at Burlington. At this meeting several notable addresses were made relative to the future development of Vermont. It was a striking fact that all of the speakers were unanimous in the opinion that the prosperity of Vermont depends upon the development of agriculture and forestry. Hon. Charles Prouty and Hon. T. N. Vail, men thoroughly acquainted with the State, and looking at matters from an entirely different angle, each laid special stress on the need of forest conservation in Vermont.

While the practice of forestry is still far behind the general interest in the subject, the increased demands upon the Forestry Department for inspection of woodlands, for general advice, and for nursery stock, and the growing interest in State ownership of large tracts, all characterize an encouraging condition.

In a few sections of the State, however, destructive lumbering is progressing on a scale hitherto unknown, and unless prompt steps are taken, considerable areas of Vermont will be turned from productive forests to worthless barrens. The reactionary policy of these large concerns, which pay no heed to the future, force one of two alternatives upon the people. Either the State must assert its right to regulate the cutting of these mountain forests, or it must embark more extensively upon the policy of State ownership. Neither can be adopted without increased appropriations, and at present the policy of purchase seems the better, although possibly the slower method.

LEGISLATION RECOMMENDED.

In 1913 twenty percent of the forest fires were attributed to railroads. Besides these, probably some of the fires, whose causes were given as unknown, may be attributed to railroads. In view of this fact, the following law, based upon the Connecticut Law, is proposed:

I. Sec. 1. Any railroad company which, through any act of its employees or agents, by sparks from its locomotives, or otherwise, sets fire to trees, brush, or grass, on lands outside the right of way of such company, shall be liable to the town or city in which such fire occurs for the lawful expenses incurred by such town or city in extinguishing such fire.

Sec. 2. A bill for such expenses shall be rendered by the local fire warden having charge of the extinguishing of such fire, and upon approval of such bill by the State Forest Fire Warden, and upon presentation thereof to the chief engineer of the railroad company liable for such expenses under the provisions of Section One of this Act, such expenses shall be paid by said railroad company.

Sec. 3. It shall be the duty of every section foreman employed by a railroad company, upon the discovery of any fire, in the section under his jurisdiction, for which said company is liable under the provisions of Section One of this Act, to summon necessary assistance, proceed to the fire and extinguish it, and to give such assistance to the town or district fire warden as may, from time to time be requested by such warden. [As most of these railroad fires start in slash resulting from lumbering near the railroad, there should be a law similar to one recently passed in Massachusetts.]

II. Sec. 1. Every owner, tenant or occupant of land, and every owner of stumpage who cuts or permits the cutting of wood or timber on woodland owned or occupied by him or on which he has acquired stumpage by purchase or otherwise, and which borders upon a railroad location, shall clear the land of the slash and brush wood then and there resulting from such cutting, for a distance of one hundred feet from the right of way, and within four months of the cutting on this strip.

Sec. 2. Whoever neglects to comply with the conditions of Section One, of this Act, may be punished by a fine of not less than five dollars nor more than one hundred dollars.

TAXATION.

It is expected that after January 1, 1915, many land owners will take advantage of No. 41 of the Acts of 1912, and have their lands classified and taxed under it. This law is not ideal, and was only passed to relieve land owners, while at the same time safeguarding the interests of the

towns. Owners should eventually classify as much of their land as possible under No. 40 of the Acts of 1912. In other words, as soon as a piece of woodland classified under No. 41 is cut off and reforested, either naturally or artificially, it should be reclassified under No. 40. Where a whole lot is thus reclassified there can be no chance for a mistake. Where only a part of a lot is thus reclassified there is no provision in the law for deducting the value of the amount thus cut from the total value assessed under No. 41.

III. An amendment to No. 41 should provide that when any portion of land classified under this law is cut off and reclassified under No. 40, that the value of the timber or wood cut, as taxed under No. 41, shall be deducted from the assessable value of the area remaining under No. 41 (provided the remaining value is not less than \$5 an acre).

For example, if 100 acres were classified under No. 41, and assessed at \$2,500 and after a period of years 40 acres were cut off and produced \$1,000 worth of stumpage upon which a yield tax was paid, this 40 acres, when reproduced, could be classified under No. 40 and assessed at \$3 an acre. The remaining 60 acres would then be assessed under No. 41 at $\$2,500 - \$1,000 = \$1,500$.

STATE FORESTS.

The appropriation for the purchase and reforestation of State forests should also be available for cuttings, so that demonstration thinnings might be made wherever practicable. Since money spent on State forests is an investment which will, in time, produce a revenue, it is recommended that the small appropriation made for this purpose be increased to \$15,000 a year. Massachusetts, in which forestry is far less important than in Vermont, has appropriated \$20,000 annually for similar work.

WATER POWERS.

At the request of Governor Fletcher, the writer represented the State at the Conservation Congress held in Washington, D. C. in December 1913. The subject of chief interest at this Congress was the public control of water powers. The report of the Congress on this subject, as finally accepted by a sweeping majority of those present, provides as follows:

"We recommend that the following principles should govern the granting of a privilege to use a water power.

(a) For a definite period, sufficient to be financially attractive to investors, the privilege should be irrevocable except for cause, reviewable by the courts:

(b) Thereafter the privilege should continue subject to revocation in the absolute discretion of the government exercised through its administrative board or officer upon giving reasonable notice and upon payment of the value of the physical property and improvements of the grantee as below provided under (h).

(c) After the expiration of the period provided for in (a) above, at recurring intervals of not more than ten years the amount of compensation to be paid to the government for the privilege and all the terms and conditions of the grant during the next succeeding period of not more than ten years shall automatically come up for determination by the granting officer of the government.

(d) The privilege shall be unassignable except with the approval of the government in order to safeguard the interests of the government against speculation in water powers and against appropriation without prompt development.

(e) The privilege shall be granted only on condition of development of the whole capacity of the power site as rapidly as the granting officer may from time to time require, giving due consideration to reasonable market demands and conditions and also on condition of continuous operations subject to such demands and conditions.

(f) The right to receive compensation for the value of the privilege varying according to the proper conditions of each case shall be reserved to the government, state or federal from whom the privilege comes. We believe that the reservation of such a right to compensation is a vital essential towards the end of proper regulation. It is not sufficient to trust that the public will always receive its proper share by means of regulation of rates alone. Local authorities may neglect or may be unable, under conflict of jurisdiction, or for other reasons, to exact in the interest of the public the full value of the public right. The value of a water power may in the course of time increase far beyond the power of local regulation to adequately distribute its benefits. At the same time, the method of exacting compensation must be carefully safeguarded so that in case full compensation by rate regulation is exacted by local authorities, an additional burden shall not be imposed. We believe that in normal cases the best method is for the government to share increasingly in the net profits of the enterprise, provided those profits exceed a certain reasonable percentage, the right of the government being recognized otherwise merely by the imposition of a small annual fee or its equivalent.

(g) The government shall have the right to prescribe uniform methods of accounting for the grantee and to inspect its books and records.

(h) Upon revocation of a privilege by the government the grantee shall be paid a compensation equivalent to the fair valuation of its property, exclusive of franchise and consequential damages; this compensation shall include such appurtenances as are necessary for the operation of the water power and the transmission of electricity therefrom but shall not include such properties as railroads, lighting systems, factories, etc., which are of themselves separate industries.

In such transfer all contracts for the sale or delivery of power made in good faith previous to such notice of transfer should be assumed by the transferee so that the said grantee may operate and maintain the power business during his occupancy of the property under such stable guarantee as may beget confidence therein by prospective long term contractors, provided, that the government or said transferee shall not assume any contracts made at a price or under conditions which shall be determined by the proper administrative officer of the government to be unreasonable or confiscatory.

GEORGE F. SWAIN, Chairman.
GIFFORD PINCHOT,
HON. HENRY L. STIMSON,
LEWIS B. STILLWELL,
CHARLES R. VAN HISE,
M. O. LEIGHTON,
E. S. WEBSTER,
B. M. HALL.

EDUCATIONAL WORK.

As explained later, the chief progress of the year has been due to the greater demand for personal advice on the handling of woodlands. This was undoubtedly greatly stimulated by the forest conferences held during the summer and fall of 1913. A forest conference consisted in an illustrated lecture on forestry in the evening, followed the next forenoon by a field trip into some woodlot. Conferences were held only in places where a guarantee of at least ten people for the field meeting could be obtained. The writer wishes to express his appreciation for the co-operation in the arrangement of these conferences, of the county agricultural advisors, especially Mr. Sweeton in Windham County, and Mr. Demary in Orange County.

Conferences were held in: West Woodstock, North Thetford, Topsham, East Burke, Greensboro, Stowe, Middlesex, Worcester, Calais, Enosburg, Berkshire, Wilmington, East Dover, Wardsboro, Townshend, East Braintree, Chelsea, West Topsham, Glover, Bristol, Westfield, West Charleston, East Charleston, Barnet, Springfield, Athens, Windham, Norwich and Duxbury. Altogether, about 2,000 people attended these meetings.

The plan of the conferences the present season is somewhat different from that of 1913. More emphasis is placed on the field work and less on the indoor meeting. Arrange-



A FOREST CONFERENCE ON THE ARLINGTON STATE FOREST—1914.



A FOREST CONFERENCE IN WINDHAM COUNTY IN 1914.

ments are being made to supply a forestry expert for one week to each county advisor. By the use of the latter's automobile it will be possible to hold two field meetings a day several miles apart.

In addition to the conferences, addresses on forestry were given at the institutes held by the Commissioner of Agriculture at the following places:

Chelsea, West Newbury, Danville, Sheffield, Newport, Barnard, Westminster, Vernon, Shaftsbury, Rupert, West Haven, Shoreham, Starksboro, Charlotte, Moretown, North Craftsbury, Cabot, Bakersfield and Cambridge.

In cooperation with the Extension Department of the University of Vermont and State Agricultural College, forestry lectures were given at the schools held at Thetford, Jericho, St. Johnsbury, Hartford, Bristol, Pittsford, Fairhaven, Morrisville, Dorset and Grand Isle.

The State Forester also delivered addresses on forestry at the following meetings:

Annual Convention of the Universalist Church at Rutland; Annual Meeting of the Vermont Sugar Makers Association at Rutland; Conferences held by the Bennington Co. Improvement Association at Bennington, Manchester and East Arlington; Congregational Brotherhood, Burlington; State Engineers Annual Meeting at Burlington; Board of Trade, Swanton; Merchants Association, Burlington; and meetings held under the auspices of the Y. M. C. A. at Vergennes and Middlebury.

Schools for the forest fire wardens were held in the spring of 1914 at Brattleboro, Wells River, Montpelier, Lyndonville and Middlebury. Through the generosity of Mr. C. M. Darling, the Lyndon Warden, the wardens attending this meeting were carried to the State forest plantation, in which they were much interested, and also entertained at dinner.

The third summer school of Horticulture and Forestry was held on the Charles Downer State Forest in August, 1913, and was more largely attended than in the previous season. In connection with this a very successful Sharon Day was held which was well attended by people of Sharon and surrounding towns. Addresses were made by His Excellency, Governor Fletcher, and President G. P. Benton of the University of Vermont.

The practice of furnishing exhibits at fairs was continued. Exhibits were shown at Middlebury, Rutland, St. Johnsbury, White River and Brattleboro.

Since issuing the last report, there have been published by the office, the following:—

Publication No. 13. "The Management of Second Growth Hardwoods in Vermont"—Bulletin 176 of the Vermont Agricultural Experiment Station. This bulletin, which is the result of a two years' study of second growth hardwoods, should form the basis of management of such lands. It contains the following parts:

- Part I. Estimating the Contents of a Woodlot.
- Part II. Improvement of the Stand.
- Part III. Yield Tables.
- Part IV. Crop maturity, and the Selection of the Crop.
- Part V. Market Conditions.
- Part VI. Enemies of Our Northern Hardwoods.
- Appendix containing Volume Tables and Curves.

Publication No. 14. A Forestry Arithmetic for Vermont Schools. The introduction of this bulletin is as follows:

TO THE TEACHER.

Forestry, as a branch of agriculture, has made remarkable progress in the past few years. People are beginning to see that the old way of considering the forest as a mine to be exploited is wrong, and that the forest should be considered as a growing crop to be protected, improved, harvested and grown again just like corn or grass, except for the length of time necessary to grow a crop. The older people have adopted this new attitude even more than could have been expected of them, considering the length of time required to grow timber. But it is with the future generation that the practice of forestry must be expected. It is, therefore, necessary to instruct and interest the young in the principles of forestry. Several books have been written with a view to giving forestry instruction that can be understood by children. Much can be accomplished indirectly through suggestion. Teachers have long recognized the value of using text books in such subjects as arithmetic and grammar, based upon the facts of country life. The purpose of this bulletin is to give the Vermont teacher some examples in arithmetic which can be used to supplement the regular text book used, and which will suggest to the scholar

many of the important forestry ideas which it is desirable for our young to have.

At the end of the bulletin are reprinted some forestry experiments originally prepared by the writer for a bulletin published by the State Commissioner of Education.

Publication No. 15. This is Bulletin 181 of the Vermont Agricultural Experiment Station—"Studies of Tolerance of New England Forest Trees," by Prof. G. P. Burns.

Forestry Card No. 17

March 1, 1914

VOLUME TABLE OF OLD GROWTH HARDWOODS

Diameter breast high	Beech		Yellow Birch		Sugar Maple	
	Total Volume	Number of trees tallied	Total Volume	Number of trees tallied	Total Volume	Number of trees tallied
Inches	Bd. Ft.		Bd. Ft.		Bd. Ft.	
13	83	12	59	7	81	5
14	115	55	95	16	119	14
15	142	52	125	23	142	28
16	167	56	146	32	162	18
17	189	44	163	32	184	34
18	211	46	186	57	207	33
19	240	25	217	50	232	20
20	275	24	250	39	255	28
21	314	16	297	40	283	16
22	359	5	331	46	319	22
23	414	6	363	25	354	18
24	473	4	388	37	382	9
25			408	30	410	9
26			434	24	430	4
27			470	28	445	5
28			505	16	447	3
29			545	4		
30			588	12		
31			619	4		
Total		345		522		266

This table was made in Herkimer Co., N. Y., by E. A. Braniff, from band and circular saws. See Bulletin 36 U. S. Forest Service. Appendix.

Forestry Card No 18.

March 1, 1914

COMPARATIVE GROWTH OF FIVE VERMONT TREES

Age Years	White Pine	Yellow Birch	Sugar Maple	Beech	White Ash	Paper Birch
Diameter in inches.						
20	5.3	2.8	2.5	2.0	4.1	3.4
40	11.3	5.5	5.1	3.9	7.9	6.8
60	15.	7.9	7.5	6.1	10.8	8.9
80	18.	9.6	9.3	7.9	12.6	10.2
Height in feet						
20	24	35	33	25	39	30
40	53	51	50	41	63	54
60	73	61	60	50	77	68
80	84	68	67	58	86	78

The above figures are averages for trees grown under ordinary forest conditions. They do not indicate the maximum obtainable under favorable conditions. See Bulletin 176 of the Vermont Agricultural Experiment Station.

Forestry Card No. 19.

March 1, 1914*

**YIELD TABLE PER ACRE SECOND GROWTH HARDWOODS IN VERMONT.
LUMBER AND CORDS**

Years	QUALITY I		QUALITY II		QUALITY III	
	Lumber Bd. ft.	Cords in addition to lumber	Lumber Bd. ft.	Cords in addition to lumber	Lumber Bd. ft.	Cords in addition to lumber
20		17.4		14.4		10.9
30		25.6		20.8		15.6
40	3500	24.1	2000	21.2	1000	17.1
50	9900	22.9	4500	22.9	3000	21.2
60	13800	20.6	8200	22.6	6600	17.6
70	15100	18.8	10900	20.6	9100	16.2
80	15800	18.2	12800	19.4	10600	15.9

NOTE—Lumber scaled by Vermont Rule with no allowance for rot or crook to 6 inches diameter outside bark at top end. In applying the above table the percentage of sound trees to unsound trees of lumber size on a lot should be estimated and the proportion applied to the amount of lumber given in the table. In converting cubic feet to cords, 85 cu. ft. of solid wood equals 1 cord. A yield table gives the average yield per acre produced in different lengths of time. A volume table gives the average volume of individual trees of different sizes. This yield table is taken from Bulletin 176 of the Vermont Experiment Station.

Forestry Card No. 20

March 1, 1914

**MERCHANTABLE VOLUME OF POPLAR IN CUBIC FEET INSIDE BARK
BY DIAMETER AND HEIGHT**

Diameter outside bark breast high	Height of tree in feet						
	30	40	50	60	70	80	90
	Volume in cubic feet						
5	0.5	1.0	1.5	2.0	3.0	....	....
6	2.0	2.5	3.0	3.5	4.5	6.0	....
7	3.5	4.0	4.5	5.5	7.0	8.5	....
8	5.5	6.0	7.0	8.0	10.0	11.5	13.0
9	...	8.0	9.5	11.0	12.5	14.5	16.5
10	...	10.5	12.0	14.0	16.0	18.0	20.0
11	...	...	15.0	17.0	19.0	21.5	25.0
12	...	...	18.0	20.5	23.0	26.5	30.0
13	...	...	...	24.0	27.0	31.5	36.0
14	...	...	...	28.5	32.0	37.0	43.0
15	...	...	...	32.0	37.0	43.0	51.0
16	...	...	...	37.0	43.0	50.0	59.0
17	...	...	...	43.0	49.5	57.0	68.0
18	...	...	...	...	57.0	66.0	76.0
19	...	...	...	...	65.0	75.0	85.0
20	...	...	...	...	74.0	84.0	95.0

*See Bulletin 93 by Weigle & Frothingham of U. S. Forest Service. This table was based on the measurements of 362 trees in Maine. To convert to cords, divide by 85 because a stacked cord contains about 85 cu. ft. of wood.

Forestry Card No. 21

March 1, 1914

TOTAL STEM VOLUMES OF PAPER OR WHITE BIRCH, BASED ON MEASUREMENTS OF 443 TREES IN MAINE AND EASTERN NEW HAMPSHIRE

Diameter breast high	Height of tree				
	50 feet	60 feet	70 feet	80 feet	90 feet
Volume					
Inches	cu. ft.	cu. ft.	cu. ft.	cu. ft.	cu. ft.
4	2.5	3.0	....	....	....
5	3.7	4.3	4.8	....	....
6	5.2	5.9	6.7	7.8	....
7	6.8	7.8	9.0	10.4	12.2
8	8.9	10.2	11.5	13.3	15.3
9	11.2	12.8	14.5	16.5	18.8
10	14.0	15.9	18.0	20.4	22.8
11	17.2	19.5	21.8	24.6	27.5
12	20.0	23.4	26.3	29.5	33.0
13	....	28.0	31.5	35.3	39.6
14	....	33.0	37.3	42.1	47.4
15	....	38.9	44.0	49.7	55.8
16	....	....	51.0	57.5	60.0

See Circular 163 by S. T. Dana, of U. S. Forest Service.

Forestry Card No. 22.

March 1, 1914.

The spring of 1914 is the time for the quadrennial appraisal of real estate. Assessor should remember that a high valuation of standing timber stimulates cutting and means a permanent loss to the town.

	ACRES		
	1000	150	50
	Case I 1% tax	Case II 1% tax	Case III 1% tax
A fair valuation on a tract.....	\$30,000	\$24,000	\$18,000
Town's income for 10 yrs. on fair valuation.....	\$ 3,000	\$ 2,400	\$ 1,800
An over valuation which forces owner to cut.....	\$40,000	\$30,000	\$20,000
Period taxed on this high valuation before cut.....	2 yrs.	2 yrs.	3 yrs.
Tax on this valuation until cut.....	\$ 800	\$ 600	\$ 1,200
Period taxed on low valuation after cutting.....	8 yrs.	8 yrs.	7 yrs.
Assessed value per acre after cutting.....	\$ 1	\$ 2	\$ 6
Tax on land after cutting.....	\$ 80	\$ 24	\$ 42
Sum of tax at high valuation for short time and low tax on cut-over land for remainder of period of 10 years.....	\$ 880	\$ 624	\$ 1,242
Loss to town because of this high valuation.....	\$ 2,120	\$ 1,776	\$ 2,358

Low valuation of timberland encourages owner to cut according to forestry principles, and to leave young timber standing.

Clear cutting means loss of permanent industries; the income producing ability of land destroyed; loss in water power; increased erosion; and a higher tax rate.

ADVICE TO PRIVATE OWNERS OF FORESTS.

By far the most encouraging sign of progress in forestry, during the past year, has been the increase in requests for inspections of woodlots. While it can hardly be expected that all those receiving advice will follow it to the letter, reports indicate that most of those visited have at least commenced to put the advice in practice. Hereafter the rules

under which inspection of private lands is made, will be as follows:

1. The Forestry Department does not estimate timber for private owners.

2. The Department will send one or more men to inspect any land in the State, and advise on its management. The only cost will be that of travelling expenses to and from Burlington, and board while doing the work.

3. A report on the work, done under the recommendations of the previous inspection, will be required before another inspection will be made.

4. The Department will supervise the marking of trees which should be cut. On tracts of less than ten acres the owner will be expected to furnish one man; on larger tracts two men.

5. The Department reserves the right to publish the reports on such inspections, and the results of work done under such recommendations.

Thinking that the reports on inspections of woodlands may have a general interest for others owning similar lands, extracts from these reports are given below:

1. Land owned by A. J. Eaton.

Town—South Royalton.

Area—100 acres.

Recommended a regular thinning of a young white pine stand; a very careful selection cutting in open field stand; a clear cutting of hemlock, followed by planting pine; and a regular thinning of hardwoods; the cutting out of inferior species and underplanting with pine where resulting stand was very open in a mixed stand of soft and hardwoods, and keeping stock out of whole area. The owner had done some very good work thinning a white birch stand, and a mixed hardwood stand.

2. Land owned by Rutland Country Club.

Town—Rutland.

Area—Probably 70 acres.

Type description.—Burned over land on Pine hill. Scattered pine growth on a gravelly pasture. Recommended—Cutting of mature pine without regard to natural reproduction. Burned land should be planted provided sufficient fire protection can be provided. Area east of the brook should at least be planted. The gravel pasture knoll should also be planted, but may be used for pasture for a few years. The best pasture should be improved as pasture land. All the swamp should be cleared and drained for agricultural purposes.

3. Land owned by E. J. Handley & Sons.

Town—East Granville.

Area—20 acres.

Type description.—The land in question is rocky pasture on a steep hillside. It is partly seeded to spruce of all ages with a few

scattering pine. It is recommended that cattle be excluded so that this land may be planted with white pine where it is not already seeded. By doing some planting each year the open areas which have been cut clear, can be restocked within a comparatively short time. The areas which can be planted the cheapest, should be taken in hand first. The oldest spruce should be cut by the strip system, avoiding especially young stands and favoring, even in the strip cut, the white pine. The younger stands where the trees are very nearly even aged, should be thinned at the same time, if market conditions will permit, that is, if the material removed in thinning will at least pay for the cost of removing. This strip system consists in cutting out strips of spruce perpendicular to the direction of the prevailing wind, or, if necessary, in order to log economically, up and down slopes. They should be as narrow as can be cut economically, if possible not over 50 feet wide. At most they should not be any wider than twice the height of the remaining trees. The width of the uncut strips will depend upon the danger of wind-fall, but probably should not be any narrower than the cut strips.

4. Land owned by J. N. Johnston.

Town—West Brattleboro.

Area—20 acres.

Type description.—The open land, which consists of about 70 acres, should be planted with white pine, taking about five years to cover the whole area. The land least valuable for pasture should be planted first, especially the area where the hard-hack is extremely rank. When this area is planted where the growth of hard-hack is so strong, it will be necessary to either plow furrows six feet apart with an ox team, or send a man ahead of the planting crew trimming out hard-hack on the spaces where the trees are to be set, thus giving the mattock-man a chance to clean out roots. With a heavy plow and ox team available, planting in the bottom of furrows would probably be most satisfactory. The hardwood land does not need immediate attention, although some fire wood can be removed from this and still improve the stand. From the area of old field spruce with the overstory of hardwoods, the hardwoods should be cut for fire wood as soon as possible, as they are whipping the tops of the better trees. The older stand of old field spruce should be marked for an improvement cutting, removing the trees which are badly diseased with red rot.

5. Land owned by Arthur Palmer.

Town—Thetford. Date of inspection July 28th, 1913.

Area—100 acres.

Type description.—Various types on a steep slope. On one patch of second growth pine an improvement thinning was recommended. Another similar patch of pine and spruce had been badly thinned by the owner. Instead of removing smaller and suppressed trees, as should be done in a thinning, and leaving large healthy trees to grow to maturity, the owner treated the lot as if it were mature, and removed the best and largest trees. The remaining suppressed trees have such small tops that good growth is impossible. It was, therefore, recommended that they also be cut and the area replanted. In another portion, where hardwoods and pine were mixed, the owner had removed the hardwoods, thus producing a good condition for the natural reproduction of pine from the remaining trees.

6. Land owned by C. C. Putnam & Son.

Town—Middlesex. Date of inspection July and October, 1913.

Area—200 acres

Type description.—Two types on slope east of Putnamville. On top of ridge a culled virgin forest of beech, yellow birch, maple, scattered spruce, basswood and ash. Below a westerly slope second growth hardwoods on land used for farming some 50—60 years ago. Second growth comprises some splendid poplar 10" to 18"; yellow birch, white ash, soft maple, etc. Selection system used on upper ridge. There was hardly anything fit to leave, but some spruces surrounded by hardwoods were left. It is hoped that some reproduction of spruce, ash and basswood will result, and interplanting of the openings with pine after cutting was recommended. In second growth stand—preparatory cutting of shelter wood system was used. All poplars were marked and much of maple, beech, etc. Most of the ash was left to reproduce. Perhaps 2-3 of the volume was marked. From the upper lot there was cut, during the winter 1913-'14, as a result of this marking:

79,009 feet of spruce,
83,825 feet of hardwoods.

From the lower lot:

36,976 feet of spruce,
74,659 feet of hardwoods.

In June 1914 a continuation of both cuttings was marked. On the upper lot the cutting in 1914 will be on the east slope instead of the west, as last year. The top of the slope was marked for a clean cutting.

7. Land owned by Mrs. G. Day.

Town—Greensboro. Date of inspection Aug. 6th, 1913.

Area—20 acres.

Type description.—This is a narrow strip of land along the shore of Caspian Lake, and is very low and swampy, with the exception of a knoll of shallow soil. The owner wishes to transform this poor pasture into forest, and was advised to plant four-year white pines. In the mature timber a very conservative cutting was recommended, removing the soft woods which are diseased with red rot. Several of the large pine are diseased. The openings made by this cutting should then be planted with Norway spruce, which is able to withstand more shade than pine.

8. Land owned by Nelson & Hall.

Town—Montgomery. Date of inspection Sept. 1913.

Area—3000 acres.

Type description.—The type is mostly hardwood land which has been culled of its spruce and is about to be lumbered for hardwoods. The hardwood trees are the only ones which can be taken into consideration, as the spruce are very scattering and should be cut unless they have very well shaped crowns and an opportunity to grow free from the suppression from hardwoods, and are free from the red rot. One of these three things will demand the cutting of most of the scattered spruce. The hardwood consists of five classes: (1).—The old mature trees which have gone by, and some of which are almost valueless; (2).—The mature trees, which, considered from their merchantable value alone, are ready to be cut, and are the most valuable part of the stand; (3).—The immature trees which have well shaped crowns, are sound and growing rapidly; (4).—Poorly shaped trees which have been crowded by the others until they have small crowns, crooked knotty trunks, and are growing very slowly, and

(5).—Young growth. To leave this land in its best shape to earn its greatest possible income, all of the third class should be left and enough of the second to prevent drying out of the soil to such an extent as to kill the other trees which are left and to prevent windfall among the remaining trees, and to furnish seed for the next crop. The method of conservative cutting which has been in operation for the last season on this land, has resulted in such an open stand that the soil has dried out excessively, and too much of the fourth class has been left. More of the second class should be left and this fourth class cut out as closely as market conditions will permit, because only the good, straight boled, well crowned trees properly spaced can make this land earn the income in tree growth that it is capable of earning. Where the profit in logging is so slight that it is necessary to remove a large percentage of the second class, the land should either be cut clear where natural reproduction has already taken place, or the fourth class may be left for shade to prevent windfall and drying out of the soil in order to get the additional growth on the third class. This, however, will result in a very small income from the land as compared with what it is capable of producing if it could be cut in the other way. In a few places, where there is very little of the third class, or in the mixture where more reproduction is started, a clear cutting which would give this young growth an opportunity, is the wisest policy.

Manufacture of by-products, which enables the utilization of this inferior crooked, knotty, low grade lumber, which makes up the fourth class, is necessary. This will mean the logging over a larger area to get the necessary amount of lumber of a quality that will produce veneer, but will leave the land in much better shape. Land which is so far from the mill and which cannot be lumbered profitably in this conservative manner, should not be lumbered at all, for the present rise in stumpage prices is probably making the land earn a bigger income than it could earn if stripped without any provision made for reproduction.

It seems very evident from all indications that there will be a shortage of other soft woods in this locality. In view of this fact the planting of white pine on the old worn out pastures of the locality is a very important part of forestry work which should be carried on here.

9. Land owned by Mr. Slade.

Town—Stowe. Date of inspection Sept. 1913.

Area—200 to 300 acres.

Type description.—Most of this land is pastured with sheep and cattle. About ten years ago the spruce was cut down to a diameter of 10 inches. The remaining stand is old growth hardwoods consisting of yellow birch, maple and beech. The owner now has an opportunity of selling the large birch which are very scattered, and was advised to do so. The open land is rapidly seeding into spruce, and it was recommended that the unseeded openings be planted with Norway spruce. Spruce is here preferable to pine because of the elevation, about 1,800 feet.

10. Land owned by Mr. Whitney.

Town—Springfield. Date of inspection Sept. 1913.

Area—15 acres.

Type description.—Stand of mature hemlock. Recommended that this be cut clean, as the trees are through growing, and that the land be planted with white pine.

11. Land owned by Mr. Beal.

Town—Springfield. Date of inspection Sept. 1913.

Area—120 acres.

Type description.—Mixture of old hardwoods, with a scattering of large hemlock. Recommended that the owner have this lot marked as there is considerable vigorous second growth of different species which should be saved, and there is danger of creating too large openings by indiscriminate cutting. The main drawback to the practice of forestry in this region, is the lack of profitable market, there being no mill which buys logs, within easy hauling distance. There are several portable mills whose owners buy lots for a lump sum and cut them off. If the owners of Lots 3, 4, and 5, can get one of these mills to locate in a central position and sell their logs by the thousand feet, there will be an excellent opportunity of carrying out the recommendations made above.

12. Land owned by Miss Ellis.

Town—Springfield. Date of inspection Sept. 1913.

Area—26 acres.

Type description.—Eight acres is an old sugar orchard, from which most of the old trees had been removed, so that there remain but about 50 to 75 trees large enough to be tapped. There is a heavy maple reproduction from 3 to 20 feet high, overtopped by scattered white birch, pignut hickory, basswood, ash, beech, and a few big hemlock. Recommended that a removal cutting be made in order to develop a young sugar orchard. All of the old trees were marked for cutting, which could be spared without creating too large openings. Maple, and the best ash and basswood, were left for shade and seed. It is thought that this cutting will release the young maple already started, which, if thinned properly from time to time, will produce a healthy young sugar orchard. Remaining 18 acres was old growth hardwood and hemlocks, with clear cut area which had seeded into hardwoods. Recommended that a selection cutting be made, removing most of the large mature birch, hemlock, beech and maple, but that the large chestnuts be held a few years for better marketing facilities.

13. Land owned by Prescott Evarts.

Town—Windsor. Date of inspection Sept. 11, 1913.

Type description.—This is in the village of Windsor, and is used as a park. It is chiefly white pine with some clumps of hardwoods. Many of the large pines are overmature, and from a commercial standpoint should be cut, but on account of esthetic reasons it was recommended that only diseased and dying trees be removed. In some places white birch is to be favored for the same reasons.

14. Land owned by Col. H. S. Foster.

Town—Calais. Date of inspection Sept. 12, 1913.

Area—50 acres.

Type description.—This is the remains of a virgin stand on steep slope east of pond. Mixture of hardwoods such as sugar maple, white and yellow birch, beech and large hemlocks 2' to 3' in diameter and occasional spruce 6"—18". On the edges there are patches of second growth spruce 3"—8". Much of the old growth is defective and should be cut. This land has been in the Foster family since the farm was cleared—over one hundred years. The forest has always been handled conservatively, with result that old age classes are over represented. Owing to the wishes of the owner, only a very light selection

cutting was marked for. Some of the larger hemlocks and defective hardwoods were marked for removal.

15. Land owned by Austine Institute.

Town—Brattleboro. Date of inspection Oct. 9, 1913.

Area—50 acres.

Type description.—Mixture of chestnut, hemlock, soft maple and other species. The inspection was asked to determine whether the chestnut was affected by the chestnut blight parasite (*Eudothia parasitica*) which had been found in southern Vermont. Inspection showed that the disease was very prevalent on clumps of young chestnuts, having already killed many specimens. In an older woodlot no sign of the disease was at first found, but on climbing some trees it was evident that the tops of many were infected. Recommended that all chestnut trees be removed from the land; also soft maple because of their inferior quality, and that the land be fenced off, and replanted with white pine. The tops of the trees cut should be piled and burned while there is a light covering of snow on the ground.

16. Land owned by Ira Rich Kent.

Town—Calais. Date of inspection Oct. 16-17, 1913.

Area—100 acres.

Type description.—Two woodlots in farm just north of Kents Corners. One is much abused sugar orchard of about 20 acres. There are probably not over 50 sugar trees per acre, if as many. Along west edge good reproduction of spruce, hemlock and fir has come in under hardwoods. Pasturing has prevented maple reproduction. The other lot is in equally bad shape. Wood for fuel has been cut clean from mixed hardwoods. On a slope which was marked there was a scattered stand of old hemlock 2' to 3' in diameter with white ash, yellow birch, butternut, etc. Down on the lower edge there is some good fir reproduction, but pasturing has prevented it in most places. There are a great many dead and down trees. Recommended—that the sugar orchard be fenced. The lot was marked for a light selection cutting, leaving many defective maples for sugar purposes which would otherwise be cut. In the other lot most of the mature hemlock, also large basswood, ash, birch, and maple were marked. In the upper part this is a preparatory cutting; and in the lower part a final cutting of the shelterwood system. It is further recommended that the openings be planted with white pine, since it was impossible to leave enough seed trees to secure good natural reproduction.

17. Land owned by Mr. Davis.

Town—Essex. Date of inspection Oct. 18, 1913.

Area—60 acres.

Type description.—About one-third is second growth pine; white and pitch 5"—15" in diameter. A few acres would cut 40,000 hard board feet per acre, and make a very interesting stand. About one-third is gray birch 2"—4" of very little value, with one patch of a few acres of mixed hardwoods; soft maple and white birch 5"—8". About one-third is very sandy open land, which should be planted with pine. Most of this has been pastured. Old pine stumps show original pine growth trees 4'—5' in diameter. Recommended—Improvement thinning in pine, favoring white, by removal of patch, etc., and a clean cutting of gray birch followed by planting white pine; also planting in the open land.

18. Land owned by Walter Dodd..

Town—Corinth. Date of inspection Oct. 21-23, 1913.

Area—100 acres.

Type description.—This is part of an old virgin forest which has been somewhat culled from time to time. On the ridges there is a good deal of old hemlock 2' to 3' in diameter. Several have died recently. Portions evidently burned over 50 years or more ago came up to white birch and poplar. On lower, moister slopes, there is considerable mixture of second growth fir, hemlock and spruce and yellow birch. Under this are clumps of splendid fir reproduction. In the openings made 15—20 years ago there are pure stands of fir 3"—5" in diameter. The lot was marked for a combination of selection and group systems and improvement thinning. Where splendid fir reproduction was started the group system was used, removing all the over-story including some good growing fir. In pure stands of fir 5" to 10" an improvement thinning was made to get better growth. In old hemlock stands on the ridges a selection cutting was made with the hope of getting a mixture of fir, spruce and hemlock.

19. Land owned by Miss Proctor.

Town—Proctor. Date of inspection Oct. 29, 1913.

Area—200 acres.

Type description.—Inspection was requested for open land on top of ridge east of Proctor village—elevation about 1,000 feet. About 50 acres is too steep and high for profitable pasture. In places the soil slipped badly during the past spring. Also on top of the ridge and on the east slope there is some cut-over hardwood land in bad shape. There are also two stands of mixed white birch and other species; one high up and one low down; and near the road about 20 acres of splendid mixed hardwoods 20-25 years old; white ash, pignut hickory, sugar maple, butternut, beech, ironwood, etc. Recommended—that the 50 acres of open land be planted, about half in 1914 and half in 1915. In 1914 plant 2,000 white ash in depression on east slope; about 10,000 white pine, either 3 or 4 years; 4,000 Scotch and 4,000 Norway pines. In places where land is slipping stakes should be driven in about 2' apart in rows 3' apart and brush piled against them to hold the soil until the trees become well rooted. The good hardwoods should be marked for a thinning, favoring ash and hickory. In mixtures of white birch the beech, ironwood and defective birch should be removed.

20. Land owned by Mr. Porter.

Town—Sharon. Date of inspection Nov. 5, 1913.

Area—500 acres.

Type description.—50 acres open field and pasture; 20 acres old field white pine; 230 acres mixed hardwoods; 200 acres birch and poplar. The mixed hardwoods are all aged stands with a large mixture of ash, basswood and red oak. The birch is largely mature but with some young stands, and the poplar is all mature. The open land has been cultivated. Timberland has been stripped of all mature pine, but very little hardwood has been cut. Recommended—Planting of open lands to white pine, except in one place where the weevil was bad, where Scotch pine should be used. Advised thinning of mixed hardwoods stands, cutting birch and poplar, reproducing ash and basswood where possible; saving part of white birch stand in other places and clear cutting and planting in still others.

21. Land owned by T. D. Hobart of Texas.

Town—Berlin. Date of inspection Nov. 6, 1913.

Area—20 acres of plantations.

Type description.—These plantations have been made in 1910, '11, '12 and '13. White pine has been planted on the driest ledges of the farm—old pasture land. Planting was carefully done and over 90% of the trees are alive, in places 95%.

In several small depressions the tops of pines had been killed back by frost of early September '13. Five feet higher up they were undamaged. Norway spruce has been planted on moister land and is doing well, very few having died. Recommended refilling vacancies in pine with 2,000 4-year white pine @ \$6.75; planting 4 acres on east of ledge with 5,000 3-year white pine @ \$5; and finishing spruce piece with 3,000 Norway spruce @ \$5.50.

22. Land owned by City of Montpelier.

Town—Berlin. Date of inspection Nov. 6, 1913.

Area—40 acres of plantations.

Type description.—Plantations of white and Scotch pines set in the spring of 1913 were inspected. Below the road Scotch pine was planted in strong grass growth which was choked out some of the seedlings. About 70% are alive. Above the road white pine planted on pasture has done better (about 80% alive). Recommended that about 5,000 4 year white pines and 5,000 3 year Scotch pines be planted in the failed places, and that on new land 20,000 3 year Scotch pines, and 20,000 3 year white pines be used. In future plantings in strong grass, furrows should be plowed 6' apart and trees set in the furrows. This method has been used by the Hartford Water Board in Connecticut in planting strong grass land.

23. Land owned by E. T. Merritt.

Town—Springfield. Date of inspection Nov. 7, 1913.

Area—200 acres.

Type description.—(1) Two rocky fields which hardly paid to cultivate. (2) A runout pasture consisting of open land, sugar orchard, mature hemlock, young sapling hardwood stand with good mixture of ash and basswood, older second growth hardwoods out of which best ash had been cut. (3) A stand of mature poplar with scattering second growth spruce. Some attempt has been made to cultivate the fields. The pasture has been heavily stocked but summer silo has been necessary. Some of the hardwoods have been cut clean and sold in Springfield at \$9 to \$10 per cord. All the mature ash and black cherry have been cut. Recommended—Using fields as intensive pasture, and excluding the stock from the old pasture. The mature hemlock should be cut and this land, together with the open land in pasture, should be planted with white pine. Thinnings and reproduction cuttings should be made in the hardwood stand, favoring ash, basswood, yellow birch, black cherry and hard maple in the above order. The poplar stand should be cut, favoring spruce reproduction.

24. Land owned by Mr. Cutler.

Town—Springfield. Date of inspection Nov. 7, 1913.

Area—50 acres.

Type description.—Mixed hemlock, spruce, hardwoods, and poor pasture, which has been lumbered over by hit or miss methods, taking out only what was needed for some special purpose at the time. Recommended—Cutting of hemlock, some spruce, and some hardwoods,

and allowing the area to seed up to white pine and other species where possible. Solving pasture problem by some other method, and planting everything which could not be reproduced naturally, as the land can be more profitably used for forest than pasture.

25. Land owned by F. S. Howe.

Town—Springfield. Date of inspection Nov. 8, 1913.

Area—100 acres.

Type description.—Rich swamp which can be made into the best of agricultural land by cleaning and draining, and an open rocky upland pasture. Another lot of second growth hardwood of various ages. Swamp has been cut nearly clean and has come into grass between the few up-rooted trees left. The mature timber has been cut in the hardwood type. The 50 acres of pasture has been rented at \$25.00 per year, or about 50c an acre. Recommended—Planting pasture land to white pine, thinning in hardwood, and securing advice of County Agricultural Agent as to using the swamp for farm purposes.

26. Land owned by I. R. Kent and Mr. Howard.

Town—Hardwick. Date of inspection Nov. 12, 1913.

Area—1,000 acres known as Judevine Lot.

Type description.—About 100 acres north of road is an old pasture partly grown up with spruce 4"—8". About 50 acres still open with the exception of occasional trees. South of road there are 6 or 8 acres of old mowing. The main area is a badly cut-over tract on north slope facing Craftsbury Road, varying in elevation by about 800 feet. Everything was cut down to 6" with exception of two ravines, practically all of the softwoods and best hardwoods. After 6 years, cutting operations fire swept over about one-third of the area in 1908. This part is today like much of east slope of Camel's Hump. The remainder has a stand of 10—15 cords of hardwood to the acre, part of which would make lumber. A few small areas of second growth hardwoods 5"—8" escaped fire. Recommended—50 acres on north of road and 6 on south should be planted with 1,000 3 year white pines per acre. Burned areas where free from brush may later be planted. The old hardwoods should be cut clean and the land planted with pine. Later a thinning should be made in second growth hardwoods.

27. Land owned by F. M. Childs.

Town—Marlboro. Date of inspection Nov. 13-14, '13.

Area—80 acres.

Type description.—(1)—Second growth spruce all ages, including quite a few of old field form. Most of the type was fully stocked. (2)—Spruce and balsam swamp. (3)—Open pasture land, slightly grazed. Small areas clear cut. Many trees infected with the disease of witches broom. Recommended—Reproduction cutting where large percentage of bull spruce, mature trees, red rot spruce, or fir, with witches broom, making small openings which will reproduce to spruce. The poor pasture should be planted and the swamp left as at present, since it will be better for agriculture than for forestry when it can be drained.

28. Land owned by Walter Pratt.

Town—Brattleboro. Date of inspection Nov. 17, 1913.

Area—75 acres in two lots.

Type description.—Back lot mixed hardwoods of inferior species. Hemlock on the upper slopes, with a scattering growth of chestnut

on the east slope. The home woodlot is a mixed stand of old growth hardwoods with some hemlock and a very little pine. The back woodlot was heavily cut some 40 years ago, but has not been touched since. The home woodlot has been thinned by taking out the timber on the farm as needed. Recommended—On back woodlot a clear cutting and planting, since natural reproduction of any desirable species is impossible. In the woodlot a selection cutting should be made.

29. Land owned by John Barney.

Town—West Brattleboro. Date of inspection Nov. 17, 1913.

Area—50 acres.

Type description.—Second growth pine even aged—ranging in age from stands which are open and mature to very young stands which have just reached the point where they ought to be thinned. The old pasture grown up to pine. Recommended—Cutting the mature stand in the smaller area and thinning the younger stands as soon as a market can be found for the material to be removed.

30. Land owned by E. B. Cobbett.

Town—West Brattleboro. Date of inspection Nov. 17, '13.

Area—25 acres.

Type description.—Mixed hardwood growth and sugar maple. The former owner has pastured the orchard, and has paid no attention to cutting out the diseased trees, and has too many trees for orchard purposes. Mature growth in the mixed hardwood stand has been pretty well cut out. Recommended—Planting pasture to white pine and a selection cutting in hardwood stand, favoring ash, basswood, oak and yellow birch, and removing the smaller suppressed and diseased trees in the maple orchard, and a few of the larger trees affected by the maple borer.

31. Land owned by H. E. Bartram.

Town—Brandon. Date of inspection Nov. 26, 1913.

Area—100 acres.

Type description.—(1)—Old field white pine of all ages with large percentage of individuals having "bull" form, and a small area of thick pine and area of second growth pine of good form. (2)—Mixed hardwood stand of very open character, and with scattering mature oak and small area of old mature poplar, and about one-third of a stand of softwood seedlings underneath the open hardwoods, and well distributed over the whole area. (3)—Small knoll of about 20 acres of open pasture land. This was used for a sheep pasture until the area became so small and the cost of keeping fences so great, that it was discontinued. Recommended—Open land should be planted to white pine. The white pine stand should be thinned in places and the openings made for reproduction in the more mature parts, or where there is a large percentage of bull pine. The oak and poplar should be cut at once, and the hardwoods clear cut, and the area planted to pine as fast as convenient.

32. Land owned by Vermont Box Company.

Town—Buels Gore. Date of inspection Dec. 4, 1913.

Area.—2,000 acres.

Type description.—This tract is on the main Green Mountain range, about 10 miles south of Camel's Hump; about 2 miles east of Hanksville; bounded on the north by Bartlett's holdings and on south by Champlain Realty Company. Tract was culled of spruce several years ago, but there are a great many scattered patches of spruce, and

hardwoods. Recommended—Plan to cut over this tract in about 10 years, having the best portions marked for spruce reproduction.

In the lower portions some of the best soil should be cut clean and replanted with either pine or spruce. With the exception of basswood and poplar, used at the box factory at Bristol, all other lumber is shipped from Jonesville. Elevation probably varies from 1,500 to 3,000 feet.

33. Land owned by Bristol Manufacturing Company.

Town—Bristol. Date of inspection Dec. 5, 1913.

Area—300 acres.

Type description.—Second growth mixed hardwoods 50—60 years old. Yellow birch, poplar, white ash, maple, etc. Type covers east slope and top of a high hill about 1 mile south of the village. Elevations vary by nearly 1,000 feet. About 25 acres on top of the ridge were cut clean in the winter 1912-13. Recommended—As soon as wood already cut is removed, plant with pine. After that, cut clean and plant annually about 27 acres a year, starting at the foot of the hill and cutting mature lots. In cutting leave a few of the best white ash and yellow birch. This plan fits in with the needs of the Company for a permanent supply of pine, as outlined below. The Company requires annually 800,000 feet of pine in addition to other lumber.

COST TO RAISE 800,000 FEET OF PINE A YEAR.

It is safe to count on 30,000 feet of pine box boards to the acre in 40 years.

To cut 800,000 feet 27 acres must be cut over each year.

In order to cut 27 acres a year for 40 years a total area of 1,080 acres is required, or say 1,100 acres.

Cost of 1,100 acres of land at \$3.....	\$ 3,300
Cost of planting 1,100 acres of land at \$10.....	11,000

Cost of planting with 4% interest 40 years.....	\$ 52,800
Value of land with 4% interest 40 years.....	12,540
Tax of 1% on land at 4% for 40 years	3,135
10% yield tax on stumpage at \$15	49,500

Total cost of producing 33,000,000 feet.....	\$117,975
Average cost per M.....	\$ 3.58
33 million feet at \$15.00	\$495,000
33 million feet at 3.58	117,975

Total saving in 40 years by planting..\$377,025

34. Land owned by D. W. Eddy.

Town—Monkton. Date of inspection Dec. 10, 1913.

Area—20 acres.

Type description.—This area is of particular interest. It is about 4 acres of pure white pine about 50 years old in splendid condition. The present stand contains about 320 trees per acre. Near this are some scraggly hardwood stands, and below is a stand of white pine 60—70 years old with exceptionally fine reproduction which the owner is cutting clean. At some distance to the south is a small clump of basswood which has been thinned too much by removing all other species. The owner has very successfully thinned the 4 acre piece twice. About 8 years ago he cut 50 cords of wood which just paid for cutting. Later he took out some logs. In places the thinning have

been followed by splendid reproduction. The older piece he had also thinned, but it was too old to respond so he decided it was best to cut clean. The reproduction, however, is largely due to this thinning. It would have been better to have left 30 to 40 healthy pines per acre for future growth at this time. On the four acre piece about one-fifth of the trees were marked, perhaps 6,000 feet per acre with the idea of another thinning in about 6 years. Logs are cut and skidded for 5c a piece and hauled to a mill about 1 mile off. Altogether the owner obtains a profit of \$12 per M. This has been the best managed lot of pine inspected by the Forestry Department.

35. Land owned by Mrs. Seager.

Town—Brandon. Date of inspection Dec. 11 and 12, 1913.

Area—15 acres.

Type description.—Area has two types of topography; about 6 acres on flat, formerly farm land, is covered with a pure stand of pine about 40 years old. Diameters 4"—12". This has not been thinned, and about 25% of the trees are dead. Many good Norway pine which invariably run larger in diameter and height than white pine. The other part of about 9 acres is on a ledge about 200 feet high. Scattered white pine 8"—20" in diameter. Some white birch, poplar, white oak, hemlock, and other species. The piece on the flat was marked for an improvement thinning. All dead and about 25% of the live trees were marked; most small trees. On the ledge a combination of selection cutting and thinning was used. Many scraggly, large topped pines, hemlocks, etc., were marked. Logs will run from 6"—15" bringing up the quality of the whole.

36. Land owned by Fred Curtis.

Town—Westfield. Date of inspection Dec. 17, 1913.

Area.—50 acres.

Type description.—Second growth spruce 8" to 15" with mixture of fir, hemlock, soft maple and other hardwoods. A few large pine and some reproduction of pine with spruce and fir. The owner has cut clean in places for winter's wood supply. Recommended—Combination of thinning and selection cutting. Remove many soft maples which are damaging thrifty young fir and spruce. Also cut mature hemlock and some of slender spruce leaving the best ones for more growth and reseeding. Pine and fir reproduction is growing very rapidly, and with proper handling, the value of the lot can be doubled in ten years.

37. Land owned by George M. Calkins.

Town—Charleston. Date of inspection Dec. 19, 1913.

Area—25 acres.

Type description.—Very good stand of old growth spruce, some trees containing 800 to 1,000 feet; also hemlock, yellow birch, white ash, basswood and fir. Parts of this stand would cut 10,000 to 15,000 feet per acre. A good many of the spruce have red rot, and some have broken off. Land is level and easily logged. Present owner is cutting off without regard to reproduction to get 70,000 feet to build a barn. His spruce butt logs will be sold in Barton for sounding boards @ \$22 per M. The haul is about 12 miles. Recommended—In order to get spruce and fir reproduction, most of the hemlock and part of hardwoods should be cut, leaving enough large topped spruce and fir supported by hardwoods to reseed. Fir reproduction will be particularly easy to secure.

38. Land owned by S. E. Gray.

Town—Morgan. Date of inspection Dec. 19, 1913.

Area—50 acres.

Type description.—This tract is just west and a little above Seymour Lake. Part of it is low and rather wet, with a mixture of cedar and fir with some brown ash, yellow birch, spruce and other species. Cedars are fairly sound and run 1' to 2' in diameter. Many are uprooted. The firs are 5" to 15" and are very tall and slender. South of this is a pasture grown up to fir 80%, and spruce 20%—ages 1—30 years, and adjoining this is an area which came up still earlier and has a good stand of the same species 30 to 50 years. Recommended.—Since fir grows more than twice as fast as cedar, the percentage of fir should be increased, i. e. a selection cutting of larger cedars should be made, leaving enough firs to seed up, and enough hardwoods to hold up the firs. Advised cleaning up "down stuff" and the largest cedar first; then going over the land again more intensively. In the mature fir stand the strip system should be used to get reproduction of fir.

39. Land owned by Windsor Cemetery Association.

Town—Windsor.

Area—20 acres.

The tract is made up of a stand of hemlock, old culled hardwood, second growth hardwood, and a sapling hardwood stand. The hemlock was marked for a selection cutting, and the older culled hardwood for clear cutting. It was recommended that the second growth hardwood be cut clean within a few years, and the sapling hardwoods thinned as soon as market conditions would permit. Planting of pine was recommended in the hemlock stand where large openings were made, in the culled hardwood where reproduction had not already taken place, and where the second growth hardwood was removed.

40. Land owned by C. F. Carpenter.

Town—Richford. Date of inspection Jan. 29, 1914.

Area—About 20 acres.

Type description.—Cut-over spruce and pine naturally coming up to fir and pine reproduction. There is a slight mixture of hardwoods and a few old growth hemlocks. This was lumbered with no regard to reproduction whatever, but accidental reproduction has fairly well restocked the area with a stand which is now all sizes from seedlings to 30 foot poles. Recommended.—Cleaning out the hardwoods which interfere with softwood growth as fast as needed for stove or cordwood; also cutting the hemlocks to the smallest merchantable diameter as fast as needed for building purposes on the premises. A few openings in the hardwoods should be made where softwood reproduction can be secured. In one or two small areas a thinning was advised in connection with the above mentioned operations.

41. Land owned by Clark & Gray.

Town—Dorset. Date of inspection Mar. 14, 1914.

Area—250 acres.

Type description.—Cut-over hardwood land, half of which is practically barren. Two-thirds of the remaining area is coming up to sapling hardwoods, and the rest to a mixture of spruce and hemlock. The lots will make very open, poor quality lumber. There is also a 12 acre open field. There will be nothing to cut for several years, and only a small area can be advantageously planted at present.

42. Land owned by G. M. Hazard.

Town—Monkton. Date of inspection Mar. 25, 1914.

Area—120 acres.

Type description.—Second growth pasture pine with a mixture of hardwoods in some localities. When the old pine stands were cut off enough was left so that a very uneven growth came in. Recommended—A thinning in younger stands; cutting trees financially mature so as to reproduce white pine, and removing hardwoods so as to favor pine where possible. Also recommended keeping stock out of the whole woodlot including the sugar orchard.

43. Land owned by A. B. Miles.

Town—Monkton. Date of inspection April 6, 1914.

Area—50 acres, scattered areas 1 to 20 acres in size.

Type description.—White pine, mostly second growth, with a little old growth on a ledge. Some red pine on the upper side on a burnt area. Recommended—That the old growth be cut after the next seed year as the land is already fairly well reproduced. Stands where "bull" pine are present should be thinned, leaving smaller but straighter trees.

FOREST PLANTING.

The planting season of 1914 was about three weeks later than in the previous year. No trees were shipped until the middle of April. However, the season was favorable for planting, as warm weather held off and it did not become dry until well into May, when the plantations had become well established.

The supply of white pine was just about equal to the demand, practically all of the three and four year trees being disposed of. Of Norway spruce raised, there was a slight surplus carried over for the fourth year.

Plantations started in previous years were enlarged, thus demonstrating the success former plantings have made. Among these may be especially mentioned the plantation made for Sally Fisher, a little girl of four years, in the town of Arlington. 37,000 trees have been planted here, which should be worth, by the time the owner is forty-four years old, about \$6,000. The Lyndon School of Agriculture has continued its demonstration plantation, by setting 2,000 white and 4,000 Scotch pine. On the dry sandy soils about Lyndon the Scotch pine has shown a splendid growth. Dr. Wm. S. Stevens has continued his extensive planting in Enosburg, having set out altogether during the past five seasons, 213,000 trees. The Norway spruce plantation made by Dr. Stevens three years ago, is one of the most successful in the State. The white pines have done well, with the exception of those set in 1911, which was the most unfavor-

able season since the establishment of the State nursery. In the town of Braintree, Mr. Geo. W. Flagg has planted in the past four years 15,500 trees. Mr. Eugene Fellows in Orange, and Mr. Dix Camp and Mr. A. A. Priest in Randolph, and Miss Vaughan in Thetford, continued plantings previously begun. Mr. G. S. Swan, representative from Tunbridge, planted 1,000 trees in 1913 and 9,000 in 1914. Mr. T. D. Hobart, and the Montpelier Water Commission, enlarged their extensive plantations in Berlin. Others in Washington County, who have previously planted, are the C. C. Putnam & Son Lumber Company in Middlesex; the Jones Lumber Company in Warren, and Hon. O. L. Martin in Plainfield. Several of those who planted in Windham and Windsor Counties had made previous plantations, e. g. the Estey Organ Company, Mr. Chas. W. Richardson, Mr. O. L. French, and Mr. E. B. Barrows, Jr., of Brattleboro; the Bellows Falls Water Department, Mr. D. P. Wright of Westminster, the Bridgewater Woolen Company, Master Harold Sawyer of Plymouth; Mr. A. B. Finney, Mr. B. H. Lamb, Mr. J. J. Parker, and Mr. Chas. Noyes in Sharon; Mr. A. B. Morgan, Mr. A. L. Powers and Mr. Edgar H. Williams of Woodstock.

The most extensive planting of the year was that of the Fairbanks Scale Company, which set 100,000 white pines on its land in St. Johnsbury. Others who started new plantations of considerable size include: Mr. Ira R. Kent on his lands in Hardwick and Calais; Mr. H. G. Shaw in Underhill; the City of Barre on its watershed in Orange; Dr. H. F. Walker in Chittenden; Miss Emily D. Proctor in Proctor; Mr. J. M. Johnston, Jr. in Brattleboro; Mr. Lee S. Haven in Londonderry; Mr. W. A. Blodgett in Royalton; Mr. H. C. Porter in Sharon; the Village of Springfield on its watershed; Mr. Geo. Waite in West Windsor; Mr. Geo. C. McCausland in Woodstock.

LIST OF TREES SOLD BY THE STATE NURSERY 1914.

ADDISON COUNTY.

Cornwall	J. E. Sperry	1,000 3 year Norway Spruce
Lincoln	E. S. Stearns	5,000 3 year white pine
Middlebury	C. L. Witherell	1,000 3 year Norway Spruce
Monkton	D. W. Eddy	3,000 3 year white pine
Shoreham	F. E. Douglas	1,000 3 year white pine

11,000

BENNINGTON COUNTY.

Arlington	John R. Fisher	12,000	3 year white pine
	H. A. Hulet	1,000	3 year white pine
Dorset	Mrs. Anna E. Gilbert	200	3 year white pine
Manchester	Lester Farnum	1,000	3 year white pine
	H. B. Kendall	1,000	3 year white pine
	James D. Purdy	1,000	3 year white pine
		16,200	

CALEDONIA COUNTY.

Barnet	A. D. Warden	1,000	3 year white pine
	H. J. Warden	1,000	3 year white pine
Danville	V. E. Lurchin	5,000	3 year white pine
Groton	Peter M. Abbott	1,000	3 year white pine
	H. R. Page	2,000	3 year white pine
	C. A. Ricker	2,000	3 year white pine
	A. G. Sawyer	2,000	3 year white pine
	Dr. H. L. Tillotson	1,000	3 year Scotch pine
Hardwick	Ira R. Kent	10,000	3 year white pine
Lyndon	Lyndon School of Agr.	2,000	3 year white pine
		4,000	3 year Scotch pine
	Mrs. Jennie Michaud	2,000	3 year white pine
	G. T. Ruggles	1,000	3 year white pine
		1,000	3 year red pine
Peacham	R. B. Kinerson	1,000	3 year white pine
St. Johnsbury	Fairbanks Scale Co.	100,000	3 year white pine
	Marcus Hovey	5,000	3 year white pine
	Chas. A. Joyce	5,000	3 year white pine
	W. C. McCrae	3,000	3 year white pine
	J. B. Stanton	3,000	3 year white pine
Waterford	L. E. Johnson	3,000	3 year white pine
		155,000	

CHITTENDEN COUNTY.

Hinesburg	F. W. Perry	1,000	3 year white pine
Milton	Hon. D. T. Hanley	500	3 year white pine
Underhill	H. G. Shaw.	4,000	3 year white pine
		1,000	3 year red pine
		1,000	3 year Norway spruce
		7,500	

ESSEX COUNTY.

Brighton	G. R. Petrie	1,000	3 year Norway Spruce
Canaan	W. B. Cook	1,000	3 year Norway Spruce
		2,000	

FRANKLIN COUNTY.

Enosburg	Dr. Wm. S. Stevens	32,000	3 year white pine
		12,000	3 year red pine
		8,000	3 year Norway Spruce

St. Albans	Hon. E. S. Brigham	500	4 year white pine
	G. C. Lee	100	4 year white pine
Swanton	P. J. Farrell	500	3 year white pine

 53,100

ORANGE COUNTY.

Braintree	Geo. W. Flagg	5,000	3 year white pine
		200	3 year Norway Spruce
Chelsea	Chas. E. Dickinson	2,000	3 year white pine
	L. A. Farrington	1,000	3 year white pine
	R. H. Stanton	1,000	3 year white pine
Fairlee	J. C. Miller	500	3 year white pine
	G. L. Robinson	1,000	3 year white pine
Newbury	J. W. Eastman	1,000	3 year Scotch pine
Orange	City of Barre	10,000	3 year Norway Spruce
	Eugene R. Fellows	2,000	3 year white pine
		2,000	2 year white pine
		2,000	3 year Scotch pine
Randolph	Dix J. Camp	5,000	3 year white pine
	E. F. Kibby	2,000	3 year white pine
	W. H. Perham	1,000	3 year white pine
	A. A. Priest	4,000	3 year Scotch pine
Thetford	C. C. Cook	250	3 year Scotch pine
	Miss C. Vaughan	2,000	3 year white pine
Topsham	J. E. Eastman, Jr.	2,000	3 year Scotch pine
	Ernest S. Locke	500	4 year white pine
		500	3 year Scotch pine
Tunbridge	Mrs. Marion Burnham	1,000	3 year white pine
	Frank J. Hayt	1,000	3 year white pine
	G. S. Swan	9,000	3 year white pine
Vershire	W. H. Orr	1,000	3 year white pine
West Fairlee	Harris M. Miller	1,000	3 year white pine

 57,950

ORLEANS COUNTY.

Craftsbury	S. R. Lathe	500	3 year white pine
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 500

RUTLAND COUNTY.

Chittenden	Dr. H. F. Walker	7,000	3 year Norway Spruce
Clarendon	E. M. Eddy	2,000	2 year white pine
Pittsford	Vermont Sanatorium	5,000	3 year white pine
Proctor	Miss Emily D. Proctor	10,000	4 year white pine
		4,000	3 year Scotch pine
		4,000	3 year red pine
		2,000	2 year white ash

 34,000

WASHINGTON COUNTY.

Barre	D. A. Perry	2,500	3	year	white	pine
	F. H. Rogers	1,000	2	year	white	pine
Berlin	T. D. Hobart	7,000	3	year	white	pine
		1,900	3	year	Norway	Spruce
		200	2	year	white	ash
		500	3	year	red	pine
	Montpelier Water Dept.	20,000	3	year	white	pine
		7,150	3	year	Scotch	pine
Calais	Walter J. Coates	1,000	3	year	white	pine
	Ira R. Kent	1,000	3	year	white	pine
Duxbury	Philip Shonio	1,000	3	year	white	pine
Middlesex	Ralph W. Putnam	13,000	3	year	white	pine
Plainfield	H. P. Hinman	5,000	3	year	white	pine
	Hon. O. L. Martin	5,000	3	year	white	pine
Waitsfield	W. H. Moriarty	3,000	3	year	white	pine
		2,000	3	year	Norway	Spruce
	Richardson Bros.	4,900	3	year	white	pine
Warren	Jones Lumber Co.	10,000	3	year	Norway	Spruce
Worcester	Elisha Fiske	2,000	3	year	white	pine
		1,000	3	year	Norway	Spruce
		89,150				

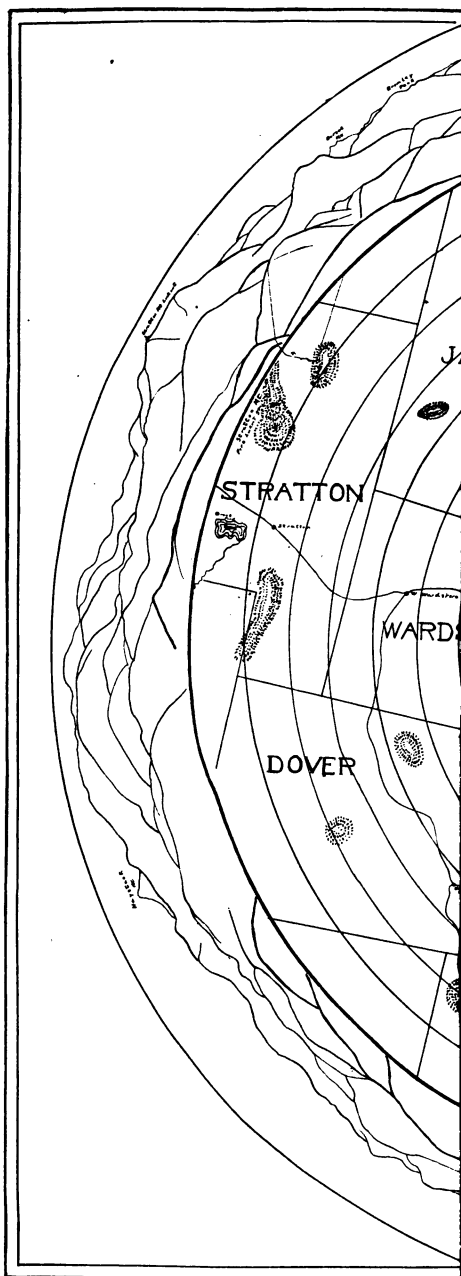
WINDHAM COUNTY.

Brattleboro	E. B. Barrows, Jr.	2,000	4	year	white	pine
	H. R. Brown	3,000	3	year	white	pine
		2,000	3	year	red	pine
	Estey Organ Company	1,000	3	year	white	pine
	O. L. French	1,500	3	year	Scotch	pine
		500	3	year	Norway	Spruce
	J. M. Johnston, Jr.	1,000	4	year	white	pine
		5,000	3	year	white	pine
		1,000	3	year	Scotch	pine
	Chas. W. Richardson	2,000	3	year	white	pine
		500	2	year	white	ash
		500	1	year	black	locust
Grafton	C. W. Fairbanks	1,000	2	year	white	pine
	Francis A. Palmer	1,000	2	year	white	pine
Jamaica	W. G. Adams	4,000	3	year	white	pine
Londonderry	F. F. Churchill	2,000	3	year	white	pine
	Lee S. Haven	10,000	3	year	white	pine
Newfane	A. M. Merrifield	6,500	3	year	white	pine
Rockingham	Bellows Falls Water Dept.	3,000	4	year	white	pine
		10,000	2	year	white	pine
		2,000	3	year	Norway	Spruce
Townshend	F. H. Davis	2,000	3	year	white	pine
Westminster	Chas. E. Howard	1,800	3	year	white	pine
		200	2	year	white	ash
	D. P. Wright	1,000	3	year	white	pine
		64,500				

WINDSOR COUNTY.

Bethel	E. L. Bass	1,000	3 year	white	pine
	Guy Wilson	200	4 year	white	pine
Bridgewater	Bridgewater Woolen Co.	3,200	3 year	white	pine
		5,000	2 year	white	ash
Cavendish	Miss F. B. Fletcher	1,000	3 year	white	pine
Chester	Dorand Bros.	1,000	3 year	white	pine
Hartland	Arthur J. Rogers	2,000	3 year	white	pine
	F. G. Spear	500	2 year	white	pine
Ludlow	Jesse H. Spaulding	1,000	3 year	white	pine
Plymouth	James D. Brown	1,500	3 year	white	pine
	Harold E. Sawyer	4,000	3 year	white	pine
Pomfret	E. Y. Dana	2,000	3 year	white	pine
Royalton	Quechee Fells Farm	2,000	3 year	white	pine
	W. A. Blodgett	30,000	2 year	white	pine
	Amos J. Eaton	2,000	3 year	white	pine
		1,000	3 year	Norway Spruce	
Sharon	A. B. Finney	1,000	3 year	white	pine
	B. H. Lamb	1,000	3 year	Scotch pine	
	Don E. Moore	1,000	3 year	white	pine
	H. W. Moore	500	3 year	white	pine
		500	2 year	white	pine
	E. H. Noyes	4,000	3 year	white	pine
	J. J. Parker	1,000	3 year	white	pine
	H. C. Porter	37,000	3 year	white	pine
	W. H. Robinson	2,500	3 year	white	pine
	F. W. Welch	3,000	3 year	white	pine
	Burnham Bibens	3,500	3 year	white	pine
	Fred C. Davis	500	3 year	white	pine
Springfield		500	3 year	red	pine
		1,500	3 year	Norway Spruce	
	W. E. Leonard	500	3 year	white	pine
	F. E. Spellman	2,000	4 year	white	pine
	Springfield Village	10,000	3 year	white	pine
	C. F. Aldrich	1,000	3 year	white	pine
	Geo. G. Waite	10,000	3 year	white	pine
	E. G. Bailey	100	3 year	white	pine
	Dr. R. W. Boyce	1,000	3 year	white	pine
	Mr. Colby	500	3 year	white	pine
	Henry W. Daniels	2,000	3 year	white	pine
	E. D. Faulkner	500	3 year	white	pine
Weathersfield West Windsor Woodstock	J. Livingston	1,250	3 year	white	pine
	Geo. G. McCausland	1,600	4 year	white	pine
		3,000	3 year	white	pine
		1,000	2 year	white	pine
		1,400	3 year	Norway Spruce	
	Edgar F. McClay	1,000	3 year	white	pine
		1,000	2 year	white	ash
	A. B. Morgan	1,000	4 year	white	pine
		1,000	3 year	white	pine
	A. L. Powers	1,000	4 year	white	pine
		16,500	3 year	white	pine
		1,000	3 year	Scotch pine	
	Edgar H. Williams	10,000	3 year	white	pine

208,250



SUMMARY OF TREES PLANTED IN 1913 BY COUNTIES.

Addison County, Private planting	11,000
Bennington County, Private planting	16,200
" " State planting	46,000
Caledonia County, Private planting	155,000
" " State planting	14,000
Chittenden County, Private planting	7,500
Essex County, Private planting	2,000
Franklin County, Private planting	53,100
Orange County, Private planting	57,950
Orleans County, Private planting	500
Rutland County, Private planting	34,000
" " State planting	45,000
Washington County, Private planting	89,150
" " State planting	23,000
Windham County, Private planting	64,500
Windsor County, Private planting	208,250
" " State planting	13,000
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Private planting	699,150
State planting	141,500
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Total	840,650

**REVIEW OF FOREST PLANTING FOR SIX SEASONS—
1909 TO 1914 INCLUSIVE.**

It is interesting to note the variety of opinion regarding forest planting and its future in Vermont. Not infrequently it is stated that forest planting will never become popular, and that few can be expected to place money in such a long time investment. On the other hand, there are those who feel that every land owner in the State should plant forests, and complain that the State nursery has not reached as many as it should. There are, undoubtedly, still people in Vermont who have not heard of the State nursery, but every effort has been made to popularize forest planting, and the writer feels that the interest has grown as rapidly as could be expected. Each year the first plantations are becoming larger and are arousing more interest, and the demand for nursery stock will undoubtedly increase at a fair rate. Although the early improvement of waste land by planting, and its increased sale value, is

appealing to more and more people, one can scarcely expect to interest owners in forest planting until they have reached comfortable circumstances.

That a great deal of money now spent for phonographs, automobiles, and other luxuries, might better be invested in forest planting, goes without saying, but it is, perhaps, beside the mark to stimulate New England thrift. What is needed is not so much more saving as wiser investment. The "Blue Sky Law" should help in this direction, but distant speculation will always appeal to some kinds of people, more than nearby conservative investments. There will always be those in Vermont ready to risk money in some California Eucalyptus concern which could be more safely invested in growing pine in their own towns, where they could watch it.

From the first the people on the east side of the State have shown more interest in forestry than those on the west side. Windsor and Windham Counties have led conspicuously in the matter of planting. For the past six years the number of trees planted in these two Counties are respectively 754,450 and 309,000. As explained in the last report, this greater interest is probably partly due to splendid demonstrations on the Billings Estate in Woodstock, and the more recent plantings on the Chas. Downer State Forest in Sharon.

It must also be partly due to the fact, that "nothing succeeds like success". Men have less hesitation in venturing a few dollars in a proposition if their neighbors are doing the same. Thrifty plantations on the East side of the State are now so numerous that every one interested can personally satisfy himself of the practicability of planting. A great many people throughout Caledonia, Washington and Orange Counties, have planted. While a large number of trees have been planted in Rutland County, the work has been done largely by a few owners. There is still much less interest in Essex, Lamoille, Bennington and Chittenden Counties, than there should be, considering the large areas in those Counties which should be reforested. While Addison and Orleans are splendid agricultural Counties, there are considerable areas in each which should be reforested.

Altogether about three million forest trees have been planting in Vermont during the first six years after the establishment of the Forestry Department. While the chief value of these plantings is educational in directing land owners' attention toward other lines of forestry, and bringing about more extensive planting, it represents a

total area of nearly 3,000 acres planted. This in itself seems small compared to the total area in the State which should be planted. If plantations were no more productive than natural forests, the actual results in lumber would be insignificant. But as every one realizes that a cultivated potato patch will produce more than one left to itself, so it must be remembered that a forest plantation is much more productive than a forest which has seeded up of itself. A pine plantation 40 years old will produce an average of 25,000 feet per acre, and one 50 years old will produce 37,000 feet per acre. The area already planted, therefore, may be expected to yield by 1954 about 75,000,000 feet, or by 1964 about 111,000,000 feet. At \$10 per thousand feet, this means a stumpage value of \$750,000 and \$1,110,000 respectively. Allowing 17,000 feet of lumber as the average load of a freight car, the lumber produced from these plantations would fill a freight train of 4,400 cars. If it were all shipped to New York and Boston it would bring to the railroads in freight rates about \$200,000; whereas, if it were all used in Vermont it would have an employment value from the stump to the finished product of from \$2,500,000 to \$7,000,000 according to its uses.

THE STATE FOREST NURSERY, BURLINGTON.

The spring of 1914 was somewhat backward, so that the transplanting work was not begun until April 20th., or nearly three weeks later than in 1913. In spite of the short season, the shipping and transplanting went on better than ever before, about 1,100,000 trees being transplanted. About thirty-five Italian laborers were employed in this work. The situation of the nursery in Burlington is particularly favorable for a large nursery for several reasons. (1)—Labor is usually obtainable at \$1.50 per day, while in other parts of the State it costs from \$1.75 to \$2.00 a day. (2)—The American Express Company calls at the nursery for the trees to be shipped, thus saving the State all cost of transportation which is incurred elsewhere. (3)—The nursery is supplied with City water, and can, therefore, be watered to an unlimited extent. (4)—The soil is light and admirably adapted for growing pines.

There were sown in the nursery in the spring of 1914, the following:

White Pine—Vermont and New York seed.....	160 lbs.
Red Pine	7 "

White Cedar	2	"
White Spruce	5	"
	<hr/>	
	174	"

Inventory of nursery stock on hand July 1, 1914.

(Ages given are for the end of the growing season of 1914).

White pine four year transplants	5,000	
White pine three year transplants	1,050,000	
White pine two year seedlings	1,200,000	
	<hr/>	2,255,000
Scotch pine three year transplants	25,000	
Scotch pine Riga variety—two year seedlings	100,000	
	<hr/>	125,000
Norway pine two year seedlings		125,000
European Larch three year transplants		7,000
White Cedar two year seedlings		40,000
Black Locust two year seedlings		10,000
		<hr/>
		2,562,000

The prices charged for nursery stock in the spring of 1914, were as follows:

White pine, four year transplants	\$6.75 per 1,000
White pine, three year transplants	5.00 per 1,000
White pine, two year seedlings	2.50 per 1,000
Scotch pine, three year transplants	5.00 per 1,000
Norway pine, three year transplants	5.75 per 1,000
Norway spruce, three year transplants	5.50 per 1,000
White ash, two year transplants	8.00 per 1,000

STATE NURSERY ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1913.

Balance on hand January 1, 1913	\$ 6.14
Received from sale of nursery stock	2,003.38
	<hr/>
	\$2,009.52

EXPENDED ON NURSERY.

Labor	\$1,622.53
Seed	169.50
Fertilizer	72.47
	<hr/>
	\$1,864.50
Balance on hand January 1, 1914	\$ 145.02

VERMONT STATE FORESTS.

Ten State Forests have been acquired, either by gift or purchase, in as many different sections of the State, and have already been very effective in stimulating an interest in private forestry. While the private owner can, in nearly all cases, make his wood lot more profitable by silvicultural treatment, it is impossible for an outside owner, like the State, to manage a small forest as economically as a large one. Since the aim is to show not only silvicultural practice, but financial results, the Forestry Department aims to increase the area of the smaller forests by further purchase, and in the future will buy only tracts of at least 500 acres, except where some special problems can be dealt with. For the benefit of those having lands which they contemplate offering to the State for sale, it may be well to state that the land will be valued not only for the timber, but for the young growth of valuable species upon the land. So much worthless land is offered for sale that occasion is taken here to announce that no tract will be considered for purchase at any price which has been wholly cut off and severely burned over during the past fifteen years. Where only part of a tract is of this character, it may be considered, if the remainder of the area has a value. The State will, however, accept gifts of land of any character suitable for the practice of forestry, provided the areas are not too small.

The first step in the management of any business should be taking account of stock. So in the management of the State Forests the Forestry Department first estimates the amount of lumber and wood on each forest. This is done by the so-called valuation survey method by which all the trees are measured on parallel strips amounting to from 10 to 20 per cent. of the whole area. The volumes of the trees are then computed from volume tables.

The next step in the systematic management of a forest is to determine the growth which a forest is making, in order that an estimate of future yield may be made. Two kinds of growth are recognized by foresters: (a) Mean annual growth; (b) Periodic annual growth. By mean annual growth is meant the average annual growth throughout the age of the forest. It is obtained by dividing the total volume grown by the age. The periodic annual growth, on the other hand, is the annual growth for a definite period in the life of the forest, usually for the last decade. Since the forest does not grow at the same rate

throughout its life, the mean and periodic growth are seldom the same. Growth studies in the field have been made for two forests, but have not yet been computed.

CHARLES DOWNER FOREST.

This forest has been more than doubled in area by a recent gift from Mr. Downer of about 500 acres of land just south of the original area. Much of this land is made up of abandoned farms, and is suitable for reforestation. The value of this forest, as a local demonstration, has been plainly shown by the growing interest in planting on the part of land owners in the neighborhood. Aside from small areas near the buildings, the whole area will eventually be used for forestry purposes. One piece of swamp has been under-drained during the past year, and the orchard has been enlarged by the planting of 50 apple trees.

Lot 31, and some other small areas, were planted in the spring of 1914 with 8,000 Norway spruce, and 5,000 white ash, in alternate rows. A new map of the original forest has been completed, the lots being renumbered. The list of plantations is as follows:

- | | |
|--------------|--|
| Nos. 2 and 4 | White pine planted in 1909. |
| No. 5 | Black locust planted in 1911. |
| No. 6 | Norway spruce planted in 1914. |
| No. 9 | White and Austrian pine planted in 1912 and 1913. |
| No. 12 | Scotch pine and Norway spruce planted in 1912 and 1913. |
| No. 13 | White pine planted in 1911 and 1912. |
| No. 14 | White pine planted in 1913. |
| No. 15 | White and red pine planted in 1911 and 1912. |
| No. 16 | White pine planted in 1913. |
| No. 17 | Scotch and white pine planted in 1911 and 1912. |
| No. 20 | Norway spruce planted in 1910. |
| No. 21 | Norway spruce and white pine planted in 1911 and 1913. |
| No. 22 | White pine planted in 1913. |
| No. 23 | European larch and Norway spruce planted in 1913 and 1914. |
| No. 24 | White ash planted in 1913. |
| No. 26 | White pine and red fir planted in 1911. |
| No. 27 | Scotch pine planted in 1910. |

No. 28	Red pine planted in 1911.
No. 29	Red pine planted in 1910.
No. 30	White pine planted in 1910.
No. 31	White ash and Norway spruce planted in 1914.

**SUMMARY OF TREES PLANTED 1910 TO 1914
(INCLUSIVE).**

Species.	No. planted.
White pine,	56,800
Red pine,	22,700
Scotch pine,	19,000
Austrian pine,	2,400
Norway spruce,	24,000
Colorado blue spruce,	100
Red fir,	5,000
Arborvitae,	1,000
Black locust,	3,000
European larch,	4,000
White ash,	15,000
	153,000

The branch nursery maintained on this forest will be made head-quarters for the growing of spruce, since the soil appears to be well adapted for this tree, though less adapted for pine than that at the Burlington nursery. During the very dry summer of 1913 the reservoir became so low that the new seed beds suffered for lack of water. The transplants, however, did better than in previous years. As is shown in the financial statement, considerable nursery stock was sold from the nursery and furnished to other State Forests.

INVENTORY OF NURSERY JULY 1, 1914.

(Ages given are for the end of the growing season of 1914.)

White pine, three year transplants,	225,000	
White pine, two year seedlings,	500,000	
	725,000	
Norway spruce, four year transplants,	8,000	
Norway spruce, three year transplants,	100,000	
Norway spruce, two year seedlings,	600,000	
	708,000	

Red spruce, three year transplants,	14,000
White spruce, three year seedlings,	400
Sugar maple, three year transplants,	600
	<hr/>
	1,448,000

The following seed was sown in June 1914:

50 lbs. white pine seed from New York.

15 lbs. Norway spruce seed purchased from the International Paper Company.

No estimate of the standing timber on this forest has been possible because the new tract has not been mapped.

The first silvicultural cutting on this forest was made in January 1914. A mixed stand of hardwoods near the house was marked for a reproduction cutting. Although the best price could be obtained for ash lumber, very little ash was marked as it is the aim of the management to secure a natural seeding of ash. In a few years after the ground is reproduced the remaining old trees, including the ash, may be cut. Prices will probably be fully as good, if not better, at that time. It will be noticed that this method of leaving the most valuable trees for seed purposes is just opposite from the usual practice of removing the most valuable trees first. This reversal of custom naturally leads to some criticism on the part of those not conversant with forestry principles.

The lumber sold was as follows:

3,544 ft. maple @ \$12. per M.,	\$42.53
1,149 ft. basswood @ \$12. per M.,	13.79
655 ft. butternut @ \$12.00 per M.,	7.86
342 ft. elm @ \$12. per M.,	4.10
470 ft. ash @ \$15. per M.,	7.05
734 ft. beech @ \$10. per M.,	7.34
300 ft. birch @ \$10. per M.,	3.00
	<hr/>
7,194	\$85.67

FINANCIAL STATEMENT JULY 1, 1914.

Superintendent's Salary	\$ 660.00
Superintendent's Expenses	249.04
Labor	1,264.41
Miscellaneous supplies	334.97
	<hr/>
	\$2,508.42



**PLANTATION OF SCOTCH PINE FOUR YEARS OLD, CHARLES DOWNER
STATE FOREST.**



**A FOUR YEAR PLANTATION OF WHITE PINE ON THE CHARLES DOWNER
STATE FOREST, SHARON.**

Credit for sale of produce	\$ 618.86
Credit for trees furnished Mendon forest	55.00
Credit for trees furnished Townshend forest	175.00
Credit for trees furnished Plainfield forest.....	110.00
	<hr/>
	\$ 958.86

L. R. JONES FOREST, PLAINFIELD.

The former policy of removing slow growing hardwoods and planting rapid growing softwoods, has been continued.

In the spring of 1914, 20,000 3 year Norway spruce transplants from the Sharon nursery, were planted on an abandoned pasture. An inspection later in the summer indicated that over 85 per cent had become established.

During the year the estimate of this forest has been completed, and is given below:

PLAINFIELD BLOCK. COMPARTMENT I.		BOARD FT.	
Spruce,		1,050,000	
Balsam,		168,000	
		<hr/>	
			CORDS.
Yellow birch,			560
White birch,			795
Maple,			184
Ash,			2
Beech,			37
			<hr/>
			1,578
BARRE BLOCK. COMPARTMENT II.			
Spruce,	48,000	50	
Spruce,	195,000		
Balsam,	39,000		
Yellow birch,		138	
White birch,		4	
Maple,		120	
Ash,		8	
Beech,		2	
	<hr/>	<hr/>	
	1,500,000	1,900	

BATTELL FOREST, CAMELS HUMP, DUXBURY AND HUNTINGTON.

The map and estimate of this forest have been completed, and show it to be the most valuable of all the State Forests. Col. Joseph Battell very generously gave this splendid area of spruce timber to the State in order that future generations of Vermonters may have an opportunity of seeing a tract of virgin timber. In keeping with the spirit of the gift, no appreciable state expense has been necessary for its upkeep, but it would be very fitting if the present good trail to the summit could be made into a wagon road, in accordance with the donor's wish. Camels Hump is, perhaps, our most picturesque mountain. It should be made accessible to all.

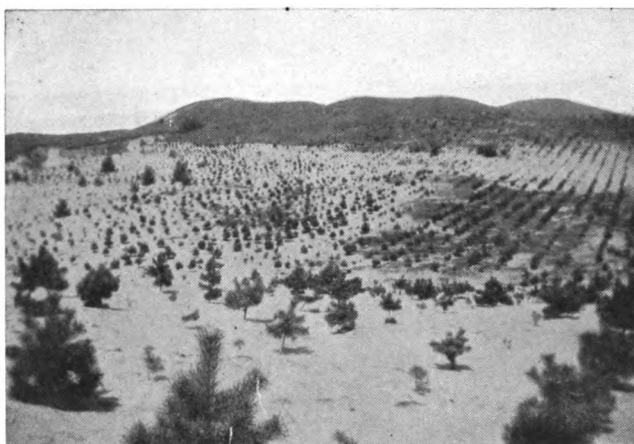
The forest plantation, made in 1913, has succeeded better than was expected, considering the elevation. The underbrush crowding the little pine and spruce was partially removed during the season.

ESTIMATE OF STAND.

HONEY HOLLOW BLOCK.		BOARD FEET.
	Spruce,	3,066,000
	Balsam,	206,000
	Birch,	1,447,000
	Maple,	272,000
HUNTINGTON BLOCK.		
	Spruce,	1,380,000
	Balsam,	184,000
	Birch,	445,000
		<hr/>
		7,000,000

LYNDON SAND FOREST PLANTATION.

The problem of controlling shifting sands is becoming more and more vital in such towns as Lyndon, where the open sand areas are increasing at an alarming rate. The State plantation has already done much to convince people of the neighborhood that pine, especially Scotch pine, will thrive on absolutely barren sand of this kind. Except on top of the main sand wave, all the plantations have been successful. There are at least 60 acres of thrifty growing plantations here from one to three years old. Experiments



**TWO YEAR PLANTATION OF SCOTCH PINE ON SHIFTING
SAND, LYNDON STATE FOREST.**



SPLENDID NATURAL REPRODUCTION OF WHITE PINE IN MONKTON, VERMONT.

have been made with willow cuttings for checking the drifting sands. Of those set in 1913 on top of the wave, about 80% were alive a year later.

SUMMARY OF PLANTING IN 1912, '13, '14.

Scotch pine,	77,000
White pine,	35,600
Norway spruce,	3,000
Western yellow pine,	1,300
Pitch pine,	50
European larch,	200
	<hr/>
	117,150

GEORGE AITKIN FOREST, MENDON.

The policy of removing slow growing hardwoods and replacing with quick growing softwoods, has been continued. During the winter 1,334 feet of spruce, and 5,320 feet of hemlock, besides 52½ cords of hardwood, were cut from the eastern portion of the tract.

In the spring of 1914, there were planted on this cut-over area and adjoining openings: 10,000 3 year Norway spruce transplants from the Sharon nursery; and 3,600 3 year red pine, 500 3 year spruce of various foreign species, 800 white ash, and 1,300 red oak from the Burlington nursery.

SUMMARY OF TREES PLANTED IN 1913 AND 1914.

White pine,	19,000
Scotch pine,	6,000
Red or Norway pine,	3,600
Norway spruce,	10,000
Varieties of spruce,	500
White ash,	800
Red oak,	1,300
	<hr/>
	41,200

Five pounds of white pine seed was also sown in seed spots six feet apart. The leaf cover and sod was scraped from these spots with a mattock or hoe, and about twenty seed was sown in each spot and covered with a half inch of soil.

The detailed estimate of this tract was given in the last annual report. The total stand amounts to 320,000 board feet and 4,855 cords. The growth on the tract will more than counterbalance the wood and lumber cut since the estimate was made, although it has not as yet been accurately determined.

WEST RIVER FOREST, TOWNSHEND.

In order to stimulate an interest in reforestation in the West River valley, and also to have a nearby supply of stock for planting on the State land, a temporary transplant nursery was established just north of the village in the spring of 1914. This nursery is like the one maintained two years ago at Lyndon. No seed was sown, and it is not in any sense a competitor of the main nursery, but is used to create local interest.

The following trees were set out in transplant rows:

60,000	2 year red pines,
25,000	2 year white spruce
100,000	2 year red spruce
45,000	2 year white pine
16,000	1 year white ash

246,000

On account of the extensive work on the highways in this vicinity, it was almost impossible to secure labor, and no attempt, therefore, was made to do any final planting.

In the fall of 1913, a very successful inspection was made of the forest by the people of Townshend.

The estimate of the forest was completed, and is as follows:

ESTIMATE OF WEST RIVER FOREST.

Spruce,	460	cords
Hemlock,	1,400	"
Yellow birch,	650	"
White birch,	500	"
Pine,	95	"
Ash,	25	"
Basswood,	40	"
Maple,	400	"
Beech and others,	430	"
Total,	4,000	"

The history of this forest furnishes an excellent example of the inequalities of taxation which exist in taxing timber lands under the General Property tax system. The tract was purchased by the State after it had been stripped of its merchantable timber. Below are the figures, given by the mill man, of the amount of lumber cut, and the stumpage value as estimated by him.

GROUT LOT:

Hemlock and spruce,	300,000 ft. @ \$4.	\$1,200.00
White pine,	136,000 ft. @ 7.	952.00
Beech, birch and maple,	124,000 ft. @ 2.	248.00
Poplar, oak, basswood and ash,	105,000 ft. @ 9.	945.00
		<hr/>
		\$3,345.00

OTHER LOTS:

Hemlock and spruce,	1,000,000 ft. @ \$5.	\$ 5,000.00
White pine,	350,000 ft. @ 8.	2,800.00
Beech, birch and maple,	721,000 ft. @ 3.	2,163.00
Basswood, white ash and oak,	116,000 ft. @ 10.	1,160.00
		<hr/>
		\$11,123.00
Total value of lumber removed,		\$14,468.00

Previous to the time of cutting this timber the assessors' valuation of these various tracts amounted to \$4,545. After the removal of \$14,468 worth of timber, the grand list on this 700 acres of stripped land was \$35.05. In other words, a difference of \$1,040 was made for the removal of \$14,468 in lumber. Obviously this tract was either assessed too low before lumbering, or too high afterwards; and this is by no means a peculiar case. Those conversant with investments in forest lands realize that culled lands are only a good investment when they can be secured at low prices and are assessed accordingly. There is little incentive to leave growing timber when it is to be overtaxed, and towns practicing such a system will suffer in the end by deforestation and reduced property valuation.

ARLINGTON FOREST.

Nearly all of the open land in this forest was planted in the spring of 1914, with the following:

White pine 4 year transplants,	10,000
White pine 3 year transplants,	16,000
Norway or red pine 3 year transplants,	20,000
	<hr/>
	46,000

This tract is in a part of the State where there has been practically no interest in forestry. It was, therefore, very encouraging to note the stimulating influence which this state planting had upon private owners of the neighborhood, evidently bringing the matter home to them in a way it had not been previously brought.

A summary of the estimate of the tract, as given in the last report, is as follows:

2,100 chestnut ties,
2,300 cords of wood.

WEST RUTLAND FOREST.

In the fall of 1913 this tract, consisting of 350 acres, was purchased by the State. It is in the extreme north-west corner of the town, being on the east slope of the Tatic range west of the True Blue Marble Mill. Like the Arlington tract, which is similarly situated, there is a considerable variation in elevation from about 900 to 1,800 feet. This is lease land, and is in two lots, one owned by the Episcopal Church, and the other is school land belonging to the town of Rutland. Like numerous lots throughout the State, the title to them cannot be secured, but a permanent lease is practically the same as a purchase. The State, in this case, pays rental to the church and town of Rutland instead of paying taxes to the town of West Rutland.

These church grants date back to about 1765, while Vermont was still a part of the British Colony of New Hampshire. Gov. Benning Wentworth, of the Colony, by authority derived from the King, in making grants to the townships, reserved to the Society for propagating the Gospel in Foreign Parts, certain portions of land in each town for the purpose of supporting the Church of England

in the Colony of New Hampshire. After the Revolution, the Episcopal Church in 1795, sent Col. John A. Graham, of Rutland*, as agent to England to ask the Society to transfer these lands to the Episcopal Church of Vermont. At that time the request was refused, but later the lands were transferred, and are still so held.

The land consists of an abandoned farm with dilapidated buildings, and woodland. As the nearest portion is a considerable distance from the highway, it cannot be advantageously tilled. The old mowings and pastures will, therefore, be reforested. In the spring of 1914 there were planted on these:

10,000 4 year white pine transplants
 4,000 3 year white pine transplants
 10,000 3 year red pine transplants
 5,000 3 year Norway spruce transplants

The lower areas were planted with pine, and the upper pastures with spruce.

The woodland is a very interesting mixture of northern and southern species. Red oak, paper birch, and spruce, mingle in a way that is seldom found. On one area the spruce was largely cut about ten years ago. Before cutting, the spruce had reproduced extensively, and the result is a splendid second growth of spruce under red oak and white birch. The latter should be removed, as it is mature, in order to give the spruce reproduction more light and moisture. On the upper slopes there is a greater per cent. of white birch.

The estimate of the tract is as follows:

	BOARD FT.	ADDITIONAL CORDS.
Spruce,	10,000	200
Oak,	90,000	200
Basswood,	90,000	
Ash,	20,000	150
Maple,	150,000	300
Yellow birch,	40,000	80
Poplar,		170
Beech and others,		400
White birch,	275,000	
	<hr/> 675,000	<hr/> 1,500
Total	675,000 Board Ft. plus	1,500 cords or
	400,000|| Board Ft. plus	2,300 cords

*See The Rural Magazine published in Rutland in 1796—Vol. II.

||Considering the white birch as cord wood.

MANSFIELD FOREST.

At the time of writing this report, August 1, 1914, the purchase has just been completed by the State of a splendid tract of 3,000 acres in the town of Underhill. It lies on the west side of the main range, just south of Mount Mansfield. The top of the divide passing through Nebraska Notch and over the summit of Mount Admiral Clark, forms the east line of the tract. It was originally a part of the old town of Mansfield, and was crossed by a once well used road passing through Nebraska Notch to Stowe. It would not require a large expenditure to improve this road, since it is well located with a good grade. From the standpoint of water supply the forest is important, since three large brooks originate on it; Stevens Brook, Clay Brook and Lee River. On the Clay Brook there is a very unusual fall or cascade, especially in spring. The perpetuation of these streams and the preservation of the fish in them, will be a great benefit to the community, not to mention the preservation of the scenery in one of the most beautiful parts of Vermont.

While the best spruce lumber was culled out about twenty-five years ago, the careless methods of cutting at that time, due to the low value of lumber, resulted in leaving a good deal of scattered spruce, as well as hardwood. With the exception of about one hundred acres at the north end, which have been severely burned, the whole area is well wooded, and offers an excellent opportunity for the practice of forestry, as soon as markets can be obtained for the poorer trees which must be gradually removed in order to make room for more valuable and rapid growing varieties. The price paid for this tract was about \$3.20 an acre. On account of its location, size and growth, it is, perhaps, the most interesting forest yet acquired, and one which will attract much attention on the part of the public.

SUMMARY OF TREES PLANTED IN 1914 ON STATE FORESTS.

CHAS. DOWNER FOREST,—SHARON.

Norway spruce,	8,000	
White ash,	5,000	
	<hr style="width: 100px; margin-left: 0;"/>	13,000

L. R. JONES, FOREST,—PLAINFIELD.

Norway spruce,	20,000
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SAND PLANTATION,—LYNDON.

Scotch pine,	3,000	
Western yellow pine,	1,000	
White pine,	10,000	
	<hr/>	14,000

GEO. AITKIN FOREST,—MENDON.

Norway spruce,	10,000	
Red pine,	3,600	
Spruce varieties,	500	
White ash,	800	
Red oak,	1,300	
	<hr/>	16,200

ARLINGTON FOREST.

White pine,	26,000	
Norway or red pine,	20,000	
	<hr/>	46,000

WEST RUTLAND FOREST.

White pine,	14,000	
Red pine,	10,000	
Norway spruce,	5,000	
	<hr/>	29,000
		<hr/>
		138,200

SUMMARY BY SPECIES.

White pine,	50,000
Scotch pine,	3,000
Red or Norway pine,	33,600
Western yellow pine,	1,000
Norway spruce,	43,000
Other spruce,	500
White ash,	5,800
Red oak,	1,300
	<hr/>
	138,200

APPROXIMATE AREA AND STAND OF STATE FORESTS.

Name	Area Acres	Board Feet	Total Stand	
			Ties	Cords
Charles Downer Forest,	800	¶		
L. R. Jones Forest,	600	1,500,000		1,900
Hapgood Forest,	100*	¶		
Battell Forest,	1,200	7,000,000		
Lyndon Plantation,	75	**		
Geo. Aitkin Forest,	850	320,000		4,855
West River Forest,	700			4,000
Arlington Forest,	225		2,100	2,300
West Rutland Forest,	350	675,000		1,500
Mansfield Forest,	3,100	¶		
	<hr/> 8,000			

**EXPENDITURES TO JULY 1, 1914, UNDER NO. 28,
ACTS 1912.****ARLINGTON FOREST.**

Purchase,	\$1,450.00	
Survey,	57.30	
Planting,	526.62	
	<hr/>	\$2,033.92

WEST RUTLAND FOREST.

Purchase,	\$1,200.00	
Survey and estimate,	160.80	
Planting,	258.87	
	<hr/>	1,619.67

WEST RIVER FOREST.

Survey,	\$ 15.40	
Planting,	282.71	
	<hr/>	298.11

LYNDON FOREST.

Planting,		55.26
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GEO. AITKEN FOREST.

Planting,		131.94
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\$4,138.90

*Besides this forest Mr. Hapgood deeded to the state the control of about 800 acres additional.

¶No estimates have been made.

**No timber to estimate.

FOREST FIRES IN 1913.

As explained in the last report, it is more convenient to consider forest fires for the calendar year than for the state fiscal year. This system has, therefore, been adopted.

The spring and summer months of 1913 were, with the exception of July, the driest since 1908. This dry period not only affected the agricultural interests, but the forests of the State were in constant danger of fires.

The following table, made up from reports of the U. S. Weather Bureau, shows how 1913 compared with the four previous years in the number of inches of rainfall during each month.

INCHES OF RAINFALL BY MONTHS—SINCE 1909.

Year	April	May	June	July	August	Sept.	Oct.	Nov.
1909	3.0	4.6	3.1	2.6	3.1	4.2	1.5	2.0
1910,	2.4	3.8	2.9	2.4	3.7	4.5	2.0	2.5
1911,	1.1	1.3	3.9	3.5	3.9	3.8	4.1	2.2
1912,	2.7	6.4	1.8	2.7	3.9	5.3	4.1	3.3
1913,	1.9	3.3	1.7	3.7	1.5	2.2	4.9	2.0

From the foregoing table it appears that the months of June, August and September were the driest since 1908. While April and May had below the normal amount of precipitation for these months, they were not as dry as during 1911. It is interesting to note how the number of fires reported varied according to the amount of precipitation during the month. Of course, where two dry months came together, such as April and May, or August and September, the latter month usually has the greater number of fires, as the forests are very much drier during these months. For example, April had 26 fires, while May had 58, and likewise August had 21 fires, while September had 24. From the above table we notice that July had 3.7 inches of rainfall, the most for several years, and the corresponding number of fires during this month was only 9.

Not since 1908 has the State suffered such a dry period as during the spring and summer months of 1913. However, the cost of fighting fire this year was only about one-third of that during 1908, which was the year previous to the establishment of the Forest Service. In that year the cost was \$10,769. The expenditure by the State of about \$1,500 in fire prevention has probably saved it at least \$6,000, for fire fighting, not to mention many thousands of dollars' worth of timber and young growth saved from destruction. As a matter of fact, most of the fires which occurred were extinguished before much damage was done, which is due chiefly to the forest fire protective system.

During the spring of 1913, this new forest fire protective policy was established, made possible by several recent laws enacted during the 1912 session of the General Assembly, and by the cooperation of the United States Government under the Weeks Law, as described in previous reports. In 1913 the Vermont Forestry Department set apart \$1,500 for this work, and thus received from the Federal Government a like sum, making a total of \$3,000 for the protection of the watersheds of navigable streams.

The state was divided into two ranges: Range I including the northwestern section of the state tributary to Lake Champlain, and range II the remainder of the state, covering the navigable watersheds. On the latter range only could the United States money be spent.

Each of these Ranges was put in charge of a ranger whose duty it was to keep in touch with the people living within his range, and to attend to all matters pertaining to fire protection. In each town there is a fire warden and in many towns, where the danger is great, a number of district wardens are appointed, who perform the same duties as the warden. Under No. 27 of the Acts of 1912, the fire wardens are appointed by the selectmen of the towns, provided, however, this is done by March first, each year. If the selectmen fail to appoint by this date, the State Forester has the power to appoint. This system is a great improvement on the previous law, since efficient fire wardens can thus be retained from year to year, regardless of political considerations.

The general plan of the protective system is to have one or more good wardens in each town; and to supplement this with a series of fire lookout stations in the wildest and most densely wooded sections; and to employ a number of patrolmen during the dry and dangerous periods of the year. Upon the first of these points, that is the warden system, depends in large measure the efficiency of the system. It will be admitted that no good fire protective system can be built up in Vermont until the people of the various towns realize the fact that forest fires are unnecessary, and are willing to turn out and extinguish small fires at once upon their discovery. The best way to attain this ideal condition is to have one or more efficient men in the town acting as fire wardens, whose business it is to see that all fires are promptly extinguished.

In several of the towns and gores of the state there are very few inhabitants, and in such places it has seemed advisable to have an additional protective force, such as lookout stations on the highest peaks, and patrolmen in

places of danger. During the past year there have been lookout stations in operation on Gore Mountain in Essex County; Burke Mountain in the town of Burke; Camel's Hump in the town of Huntington, and Bald Mountain in Townshend. All these stations, which are located on peaks from which a commanding view of the surrounding country may be obtained, are equipped with telephone connections, cabin, and the two first named stations with towers. The Gore and Burke Mountains were established by private owners of woodlands in those sections, while the state established the other two which are located on state forests. The Gore Station is located in one of the wildest and most densely wooded areas of the State, commanding a view of some 100,000 acres of woodland. During the past season several fires were reported by the watchman. The danger in this section is especially great in view of the fact that extensive lumbering is being carried on, much of it being pulp jobbing, which is continuous both summer and winter. The other three stations, although not covering as large areas, are of considerable importance, as they overlook wooded regions in very mountainous localities. A fund was raised in the fall of 1913 by parties interested in the woodlands of the southern part of the State, for the erection of a lookout station on Stratton Mountain. At the time of writing a sixty foot steel tower is in process of erection, thus making it possible to see over the tops of the surrounding trees.

During the past season federal fire patrolmen have been employed during the extremely dry periods. These men have done much good work wherever they were located. There has been one man covering the timbered section of the southern part of the state, and while the section is far too large for one man to look after satisfactorily, his work has been of great value in making hunters, fishermen and campers more thoughtful in the use of fire in the woods. Another man has been located on the Rutland Section of the Green Mountain Trail, using Killington Peak as a lookout point. Three men have been employed as patrolmen along railroads during the extreme dry times, thus preventing the numerous small fires set by the locomotives from doing much damage. On a section of the Central Vermont Railroad for instance, where no patrolman was employed, one fire was started and burned over approximately 1,000 acres. This was the largest fire of the season, and probably would have been prevented if the railroad had taken the precaution of employing a patrolman for a few weeks in dry weather along the right of way.

During the year there were 167 fires reported from 96 towns. The total number of acres burned over amounted to about 5,635, which is less than two-tenths of one percent. (.2%) of the total forested area of the State. The total cost of fighting these fires amounted to \$3,115.82, which was paid by the various towns in which the fires occurred, with the exception of \$210.59 which was paid by the State in the case of a fire in the town of Stratton. This is the sum over five percent of the grand list of the town.

Over 70 percent of the fires were surface fires; 11 percent ground fires; 11 percent surface and ground; and the remaining 8 percent a combination of ground, surface and crown fires.

The areas burned over, and cost of fighting by counties, are as follows:

COUNTY.	ACRES BURNED.	COST OF FIGHTING.
Addison,	484	\$ 480.77
Bennington,	358	70.43
Caledonia,	213	302.33
Chittenden,	495	169.25
Essex,	253	141.30
Franklin,	137	87.95
Grand Isle,	1	1.80
Lamoille,	129	70.11
Orange,	18	130.16
Orleans,	36	59.52
Rutland,	1,199	710.78
Windham,	437	433.51
Windsor,	532	185.25
Washington,	1,343	272.66
	<hr/> 5,635	<hr/> \$3,115.82

The reported fires were caused in many ways as follows:

CAUSE.	NUMBER OF FIRES.	PER CENT.
Unknown,	60	36
Railroad,	33	20
Brush burning,	15	9
Smokers,	16	9
Fishermen and hunters,	11	7
Berry pickers,	8	6
Spite fires,	7	4
Portable mills,	4	2
Lightning,	4	2
Caught from fires in buildings,	4	2

Picnickers,	3	2
Bee hunters,	2	1
Total,	167	100

Most of the fires occurred in the month of May, 58 being reported in this one month. Following are the months and the number of fires occurring in each:

March,	1 fire
April,	26 fires
May,	58 "
June,	24 "
July,	9 "
August,	21 "
September,	24 "
October,	2 "
November,	2 "

Over two-thirds of the fires which were reported burnt over less than 25 acres each. The following table shows the number and extent of the fires.

Number of Fires.	Size of Area Burned Over.	Total Acreage Burned.
127	Less than 25 acres each	739
17	Burned from 25 to 50 acres	500
9	Burned from 50 to 100 acres	580
11	Burned from 100 to 500 acres	1,816
3	Burned from 500 to 1000 acres	2,000
Total 167		5,635

One very evident conclusion from the foregoing statistics, is that more small fires have been reported this year, but that they burned over a smaller area than in previous years. This probably indicates that the wardens in the various towns are more active, both in reporting fires and also in extinguishing them before many acres are burned over. The three fires, which together burnt over approximately 2,000 acres, were in the towns of Wells, Middlesex and Sharon. The Wells fire started in a neighboring town and as it was not promptly put out by the officials there, it spread rapidly into the town of Wells where it was finally extinguished. In the case of the Middlesex fire, there was difficulty in getting men out, and meanwhile it spread over about 1,000 acres. The Sharon fire got under headway before anyone attempted to stop it. In all three of these fires, if the people of the towns had turned out at the beginning of the fire, very little damage would have resulted.

SUMMARY OF FIRES FOR 1913.

Town	Date	Duration	Cause	Area burned acres	Damage	Expense	Warden
Addison	June 14	1	Picnic Party	.3		\$ 5.00	L. M. Gage
Alburgh	May 9	3 hrs.	C. V. R. R.	.3		.20	H. J. Booth
	May 15	5 hrs.	C. V. R. R.			.60	H. J. Booth
	May 28	4 hrs.	C. V. R. R.	1		1.00	H. J. Booth
Athens	June 11	4 hrs.	Unknown	3	\$ 90.00	15.16	F. E. Ober
Averill	May 5	9 hrs.	From roadside	3		5.00	I. C. Holmes
Bakersfield	May 4	24 hrs.	Unknown	75		1.50	O. J. Maynard
Barnard	April 21	4 hrs.	Saw-mill	5	50.00	3.25	C. L. Sleeper
Barre	Sept. 28	3 wks.	Hunters	2	30.00	12.00	D. T. Gregory
	Sept. 1	6 hrs.	Brush burning	5		1.00	D. T. Gregory
	Aug. 15	2 mths.	Unknown	2		10.00	D. T. Gregory
Barton	May 8	6 hrs.	Unknown	3		3.00	E. R. Cook
Benson	Sept. 6	13 dys.	Fishermen	7	100.00	43.60	D. L. Barber
	Sept. 28	7 dys.	Brush burning	5		17.00	D. L. Barber
Bethel	June 5	3 dys.	Unknown	10		21.00	W. H. Smith
Bloomfield	May 1	8 hrs.	Unknown	7		3.75	Geo. R. Monell
Bolton	May 4	3 hrs.	Brush burning	.5		3.50	E. E. Hall
Braintree	May 3	1 hr.	B. & M. R. R.	1	25.00	1.50	Wm. Ladue
Brattleboro	April 22	1 hr.	B. & M. R. R.	.5	10.00	3.50	F. R. Thomas
	June 30	1 hr.	B. & M. R. R.			3.00	F. R. Thomas
	April 19	4 hrs.	Brush burning	25		3.66	J. G. Stafford
	April 15	1 hr.	B. & M. R. R.	2		2.20	F. R. Thomas
	April 10	1 hr.	B. & M. R. R.	.5		1.00	F. R. Thomas
Bristol	April 26	4 hrs.	Brush burning	10		3.40	Geo. S. Farr
	May 4	12 hrs.	Unknown	20	200.00	11.50	Geo. S. Farr
	Sept. 8	7 dys.	Bee hunters	100	300.00	212.54	Geo. S. Farr
Brunswick	May 3	2 dys.	Dropped match	40	50.00	25.00	James Conn
Cabot	May 9	1 hr.	Pipe	2		1.50	S. J. Norris

Castleton	May 11	4 dys.	Unknown	175		17.20	H. P. Morgan
	May 20	1 day	Berry pickers	10		3.00	H. P. Morgan
	Aug. 15	8 dys.		300	50.00	116.25	H. P. Morgan
	Aug. 26	1 day	Unknown	5		4.80	H. P. Morgan
Colchester	July 1	24 hrs.	Unknown	5		4.23	Eug. Hamilton
Concord	May 6	5 dys.	Unknown	200	325.00	112.55	E. A. Morse
Cornwall	July 4	16 hrs.	Smoker	5		10.00	F. E. Foote
Craftsbury	May 11	12 hrs.	Unknown	1	50.00	21.65	W. P. Kaiser
Danville	June 11	18 hrs.	Unknown	3		1.88	F. E. Allen
Dorset	Aug. 20	2 dys.	Berry pickers	6		10.25	A. A. Roberts
Dover	July 18	6 hrs.	Unknown	3	25.00		Dorr F. Fitch
Dummerston	May 1	3 hrs.	Match dropped	3			W. W. Burnham
	April 15	3 hrs.		3	50.00		W. W. Burnham
Duxbury	May 15	2 hrs.	Cigarettes	.5			W. W. Burnham
	Sept. 28	30 hrs.	Smoker	3	10.00	16.02	Philip Shonio
	Aug. 20	52 hrs.	Berry pickers	.5	15.00	22.09	Philip Shonio
Essex	May 12	1 hr.	C. V. R. R.	1		.35	David Demag
	May 15	4 hrs.	Smoking.	3		4.25	David Demag
	May 12	2 hrs.	C. V. R. R.	8		1.00	David Demag
	May 7	4 hrs.	Unknown	7		9.85	David Demag
	May 6	6 hrs.	Incendiary	17		13.75	David Demag
	May 9	8 hrs.	C. V. R. R.	35		27.00	David Demag
	May 10		Incendiary	10		13.40	David Demag
	May 8	5 hrs.	Incendiary	1		3.25	David Demag
	May 8	4 hrs.	C. V. R. R.	30		12.80	David Demag
	May 3	4 hrs.	C. V. R. R.	4		2.40	David Demag
	April 23	2 hrs.	C. V. R. R.	4		2.20	David Demag
	April 26	3 hrs.	C. V. R. R.	4		2.85	David Demag
	April 26	3 hrs.	Incendiary	1		2.30	David Demag
	April 23	5 hrs.	Carelessness	7		3.75	David Demag
	April 21	5 hrs.	C. V. R. R.	2		2.25	David Demag
	Mar. 19	4 hrs.	C. V. R. R.	40		6.65	David Demag
	Sept. 9	4 hrs.		4		8.00	David Demag
	Sept. 4	4 hrs.	Berry pickers	6		9.00	David Demag
	Sept. 7	4 hrs.	Berry pickers	2		3.00	David Demag

SUMMARY OF FIRES FOR 1913—(Continued).

Town	Date	Duration	Cause	Area burned acres	Damage	Expense	Warden
Essex	Nov. 7	5 hrs.	C. V. R. R.	50		\$ 12.47	David Demag
Fairfax	Sept. 2	5 hrs.	Unknown	1		5.00	G. T. Rooney
	Aug. 21	5 dys.	Unknown	10	\$200.00	59.70	G. T. Rooney
Fair Haven	Aug. 20	2½ dys.	Match dropped	50		45.00	E. W. Morse
Ferrisburg	Aug. 25	4 dys.	Unknown	5		5.7	C. R. Hawkins
Fletcher	April 0	24 hrs.	Portable mill	37	100.00	14.00	C. F. Corse
Georgia	April 27	12 hrs.	C. V. R. R.	.5			F. W. Bliss
	Sept. 7	15 hrs.	C. V. R. R.	6		2.00	F. W. Bliss
Greensboro	May 12	10 hrs.	Brush burning	1.5	10.00	5.00	J. Irwin Wilson
Groton	Sept. 9	2 hrs.	W. R. R. R.	15		1.75	H. M. Ricker
Guilford	June 30	2 hrs.	Hunters	3			E. E. Gaines
Hardwick	May 13	10 days.	Hunters	100	90.00	210.00	C. A. Stanford
Hartland	April 26	3 hrs.	Locomotive	1			J. G. Britton
Huntington	May 4	1 day	Incendiary	2		3.50	A. J. Swinyer
	April 27	3 dys.	Unknown	50		21.24	A. J. Swinyer
Hyde Park	May 6	48 hrs.	Unknown	75	350.00	21.48	H. A. Davis
	April 22	2 dys.	Unknown	35		4.63	H. A. Davis
Jamaica	Oct. 1	24 hrs.	C. V. R. R.	25		1.50	A. H. Coleman
	May 4	4 hrs.	C. V. R. R.	9	25.00	16.75	L. E. Grout
	June 14	2 dys.	Portable mill	15		3.30	L. E. Grout
Leicester	May 6	7 hrs.	Unknown	8	62.00	13.75	Geo. E. White
Ludlow	July 23	3 dys.	Lightning	1	15.00	10.00	J. Wilmoth
Marlboro	July 7	5 hrs.	Unknown	3.5		4.00	C. N. Perry
Mendon	Aug. 18	2 dys.	Unknown	3		.75	G. H. Bristol
	Nov. 6	2 hrs.	Unknown	10	20.00	3.00	C. A. Rich
	Aug. 8	3 dys.	Unknown	140	450.00	74.21	C. A. Rich
Middlebury	May 11		Unknown	30		27.61	H. E. Everts

Middlesex	May 1	3 dys.	C. V. R. R.	1000	1000.00	30.20	B. W. Daniels
Milton	Aug. 25	3 dys.	Berry pickers	20	25.00	29.30	Jos. A. Chapin
Monkton	Oct. 10	48 hrs.	Hunters	200		17.50	B. D. Martin
Montgomery	May 4	14 hrs.	Unknown	125	200.00	37.50	B. L. Lawrence
Montpelier	April 2	8 hrs.	Brush burning	7		5.75	A. R. Gates
	May 6	2 hrs.	Unknown	2			W. A. Potter
	May 3	3 hrs.	Unknown	2			W. A. Potter
	April 26	1 hr.	Unknown	2			W. A. Potter
Morgan	May 4	3 dys.	Unknown	25		28.00	E. J. Batchelder
Morristown	Sept. 28	24 hrs.	Unknown	.5	25.00	7.25	J. L. Staples
	April 26	5 hrs.	Incendiary	30	200.00	15.50	J. L. Staples
Marlboro	June 29	3 mos.	Unknown	150	400.00		C. N. Perry
Mount Holly	July 23	13 dys.	Lightning	.5		47.55	C. A. Gates
Mount Tabor	Sept. 2	20 hrs.	Smoking	3		27.29	W. H. Allen
	May 15	3 hrs.	Rutland R. R.	1		1.00	W. H. Allen
Newark	May 10	2 dys.	Unknown	1		6.25	Wallace Hudson
Newfane	July 15	1 hr.	C. V. R. R.	.5			H. J. Heath
Newport	Sept. 2	2 dys.	Brush burning	1.5		1.87	Eug. Labounty
Northfield	April 23	3 hrs.	Smoker	30	15.00	18.00	G. B. J. Edwards
	Sept. 28	78 hrs.	Unknown	2	25.00	15.00	G. B. J. Edwards
	Sept. 29	18 hrs.	Hunters	1	10.00	10.80	G. B. J. Edwards
Orange	Sept. 11	4 dys.	Roadside	2		11.29	G. E. Nelson
Orwell	Sept. 12	5 dys.	Unknown	40	150.00	100.00	F. Conway
Peacham	Sept. 8	2 dys.	Unknown	1	20.00	4.20	Leonard Welch
Peru	May 2	2 hrs.	Brush fire	25	200.00	41.47	S. J. Whitney
Pittsford	July 2	7 dys.	Lightning	9			P. E. Mooney
Plainfield	May 2	3 hrs.	Smoker	30			John Foss
Poultney	Aug. 2	12 hrs.	Unknown	10		21.00	M. B. Carvay
Randolph	May 12	4 dys.	Brush burning	15		38.67	C. C. Gifford
Rockingham	April 18	6 hrs.	Brush burning	70	100.00	17.05	H. A. Stoddard
	May 3	2 hrs.	Rutland R. R.	2		.50	H. A. Stoddard
Royalton	June 11	7 hrs.	C. V. R. R.	5		7.25	W. H. Smith
Rutland	May 11	4 hrs.	Smokers	.5		1.20	F. B. Clark
	Aug. 17	4 hrs.	Berry Pickers	5		7.95	John Callahan
Ryegate	June 8	12 dys.	Fishermen	100	1000.00	75.00	C. A. Meader

SUMMARY OF FIRES FOR 1913—(Concluded).

Town	Date	Duration	Cause	Area burned acres	Damage	Expense	Warden
Searsburg	June 16	4 hrs.	Deerfield V. R. R.	2		1.88	W. E. O'Brian
	May 14	2 dys.		40	120.00	10.00	W. E. O'Brian
Sharon	May 6	10 dys.	Deerfield V. R. R.	150	450.00	1.00	W. E. O'Brian
Shrewsbury	April 22	.5 hrs.	Smoker	500	600.00		Leland Rich
Springfield	Aug. 25	18 hrs.	Unknown	1		18.00	E. E. Aldrich
	April 22	6 hrs.	Unknown	2		2.00	W. D. Stearns
Stamford	Aug. 20	2 dys.	Unknown	3		50.00	W. D. Stearns
Starksboro	June	12 hrs.	Unknown	50		6.00	W. H. Seeger
Stratton	May 10	7 hrs.	Unknown	6		7.50	A. E. Clifford
Stowe	June 18	11 dys.	Fishermen	30	2000.00	291.40	D. H. Forrester
Sunderland	May 9	6 hrs.	Fishermen	5		10.50	Craig O. Burt
	April 18	36 hrs.	Unknown	80	225.00	16.30	I. M. Bentley
	Aug. 19	24 hrs.	Berry Pickers	5	20.00	25.00	E. G. Bacon
Topsham	Aug. 14	6 hrs.	Fishermen	10		11.00	J. K. White
Townshend	June 14	1.5 hrs.	Smoker		5.00		P. D. Chamberlin
	June 14	.5 hrs.	C. V. R. R.	.5			P. D. Chamberlin
	July 25	.5 hrs.	C. V. R. R.	.5			P. D. Chamberlin
	June 15	.5 hrs.	C. V. R. R.				P. D. Chamberlin
Vernon	Aug. 18	2 dys.	Brush burning	1		10.00	E. Stebbins, Jr.
Wallingford	April 22	2.5 hr.	Brush burning	30		10.00	R. W. Hopkins
	April 26	15 hrs.	Unknown	20	75.00	25.00	R. W. Hopkins
	Aug. 3	7 hrs.	Unknown	1		5.00	R. W. Hopkins
Waterbury	Sept. 9	4 hrs.	Spark, fr. barn			4.00	R. W. Hopkins
	Sept. 9	1 hr.	Picnickers	40		14.00	Geo. W. Grover
Waterville	May 1	3 hrs.	Unknown			59.00	Geo. W. Grover
Wells	May 4	5 hrs.	Fishermen	500	100.00	10.75	G. M. Morrison
West Haven	June 29	6 dys.	Unknown	1		254.82	G. D. Carter
	June 15	6 hrs.	Unknown			4.00	G. T. Bigelow

Westminster	June 20	8 dys.	Unknown	2	10.00	3.25	G. T. Bigelow
	Sept. 16	1	Unknown	2	20.00	5.50	G. T. Bigelow
Weston	July 5	5 dys.	Lightning	25		30.96	C. H. Spaulding
W. Rutland	June 28	7 hrs.	Unknown	50		29.53	C. H. Spaulding
Wheelock	June 13	5 dys.	Portable Mill	2		42.25	W. S. Shattuck
Williamstown	Aug. 20	2 hrs.	Spite fire.	6			John Nolan
Woodbury	May 12	1.5 dys.	Brush burning	7		3.00	L. L. Leavitt
	July 29	10 hrs.	Picnic Party	.5			E. P. Clogston
	May 6	4 hr.	Smoker	.5			I. B. Fair
Woodstock	May 3	24 hrs.	Brush burning	200	100.00	12.00	Lee Daniels
Worcester	Sept. 13	6 hrs.	Unknown	.5	bldg.	2.00	J. B. Fair
	June 11	15 hrs.	Smoker	6		49.50	I. E. Curtiss
	May 11	5 hrs.	Hunters	2	50.00	14.00	E. E. Howison
Total.				5,635.6	\$9,847.00	\$3,115.82	

TRAIL CONSTRUCTION.

As in previous years, the Department, through the use of federal patrolmen, has cooperated with the Green Mountain Club in the work of constructing the so-called "Long Trail". Previous to 1913 the trail had been mostly on paper, as there had been no sufficient funds to work with. Interest aroused by the trail constructed by the Department in 1912 between the Woodstock Stage Road and Killington Mountain, lead to several very generous donations on the part of public spirited citizens. These, together with appropriations of the various sections of the Green Mountain Club, and a substantial assistance from the Appalachian Club of Boston, made possible in 1913 a rough trail from Mount Mansfield on the north to Killington on the south, a distance of about one hundred and fifty miles. The portion of this trail lying south of Camel's Hump was located by the Forestry Department on a 15 per cent. grade. So far as is known this is the longest continuous trail in the East, and if properly developed should prove an important agency in developing Vermont as a summer resort, and what is of more importance, in encouraging the people of the State to tramp over our mountains. While it would be well to extend the trail eventually to the Berkshires in Massachusetts, as has been suggested, the money available during the next few years can be spent to better advantage in completing the portion already begun. Vermont should have not only the longest, but the best trail in the East.

The Forestry Department has been particularly active in the development of this trail following the policy of the various forestry departments in Europe, which have done so much to develop the tourist business. Aside from this however, the trail will be of great benefit in making the mountain sections easily accessible for fire fighting. If the land owners can be persuaded to equip telephone stations at convenient points, the efficiency of the patrol service will be greatly strengthened.

FINANCIAL STATEMENT JULY 1, 1914.

Salaries, State Forester and Assistants,	\$ 3,769.06
Downer State Forest,	2,508.42
State Nursery,	2,199.09
Fire Prevention,	979.07
Railroad, livery, hotels, etc., Forester and Assistants,	865.87
Clerical force,	616.25
Townshend State Forest,	341.59
Investigations,	300.00
Postage, stationery, telephone and telegraph,	282.96
Printing,	161.93
West Rutland State Forest,	115.87
Disease eradication,	114.72
Lyndon State Forest,	81.00
Instruments, tools and office supplies,	75.71
Camel's Hump State Forest,	68.41
Freight and express,	52.02
Plainfield State Forest,	46.54
Insurance,	17.25
Geo. Aitkin State Forest, Mendon,	11.22
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	\$12,606.98

MONIES TURNED INTO STATE TREASURY.

Burlington—State Nursery,	\$ 981.61
Sharon—Charles Downer State Forest,	618.86
Mendon—Geo. Aitkin State Forest,	164.70
Travelling and contingent exp. (refund from private parties),	18.81
Plainfield—L. R. Jones State Forest,	15.00
Townshend State Forest,	8.00
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	\$ 1,806.98

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